HAWASSA UNIVERSITY

OFFICE OF VICE PRESIDENT FOR RESEARCH AND TECHNOLOGY TRANSFER

RESEARCH PROGRAMS DIRECTORATE

ABSTRACTS OF RESEARCH ARTICLES PUBLISHED BY ACADEMIC STAFFS OF HAWASSA UNIVERSITY

Complied

By

Dr. Alemayehu Regassa
Dr. Dessie Sheferaw
Mr. Yekatit Hailu
Foreword

This booklet comprises abstracts collected from the published articles by academic staff of Hawassa University in peer-reviewed local and international journals, book chapters and edited proceedings of workshops. These are not the only abstracts published by the staffs during the last many years, rather it can be noticed that there are still quite a significant number of articles published by the University staffs but have not been reported to the Research Programs Directorate within the announced period of time in soft editable copy, and hence not included in the current compilation of abstracts. Therefore, there will definitely be another volume which will be published in the future.

From these abstracts, a large number were from the School of Animal & Range Sciences followed by School of Veterinary Medicine, School of Plant & Horticultural Sciences and others. This compilation doesn’t include papers from the staffs of Wondogenet College of Forestry and Natural Resources as booklet of abstracts were published earlier at the College level.

It is hoped that the complied abstracts will be useful to researchers, graduate students and all interested readers. They present the main findings reported in each publication and also provide a full citation of the publication for those who are interested in the whole content of the published material.

At this point, I would like to thank those academic staffs that responded to our request and submitted their abstracts/full publications in soft and hard copies which have been included in this compilation. Our office encourages all the academic staff of our University to build the tradition of submitting hard and soft copies of their publications to the Research Programs Directorate as soon as they publish so that we can compile the publications in an incessant way in the future.

Alemayehu Regassa (Dr.)
Director, Research Programs Directorate
Hawassa University
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COLLEGE OF AGRICULTURE AND RANGE SCIENCES


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**Abstract**: A survey study was conducted in Ezha district of Gurage zone to understand the hygienic practices during production and further handling of milk and milk products; and their utilization. One hundred and twenty households were selected based on ownership of dairy cows, milk processing practice and willingness to participate in the study from two agro-ecologies (Dega and Woina Dega) within the district. None of the respondents washed udder before milking. The majority of women washed the equipments (90.8%) and their hands (71.5%) before milking. *Olea africana* and *Hygenia abyssinica* plant leaves were the most commonly smoking and cleaning plant species in the district. The average volume of milk churned at a time was 6 L. Women preserve butter by mixing with spices such as *Nigella sativa*, *Aframomum angusti-folium*, *Trigonela fenum* and *Ocimum hardiense*, while Ayib is preserved with the use of *O. hardiense*. Out of the total monthly milk production (55 L), 13.5 L were consumed, whereas the remaining was accumulated for further processing. Among milk and milk products produced, only butter and Ayib were supplied to local markets. Lack of clean water for cleaning purpose; limited knowledge on hygienic handling of milk and milk products; and unimproved milk processing materials were the three major constraints reported by the respondents according to their importance. Recognizing the importance milk and milk products to the producing household nutrition, health and income, development interventions are required to boost production, improve the quality of the products and efficiency of the traditional milk processing equipment.

**Key words**: Milk and milk products, hygiene, processing, utilization, Ezha, Ethiopia.


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**Abstract**: The objective of current study was to assess hygienic quality of raw whole milk in Ezha district, of Gurage zone, Southern Ethiopia. A total of 120 randomly selected milk producing households were interviewed to assess milk production, hygienic conditions, utilization and processing of milk and milk products. A total of 40 raw milk samples were aseptically collected and tested between February and March 2010 for microbial analysis. Average counts of Aerobic Mesophilic Bacterial Count (AMBC), Coliform Count (CC) Entrobacteriacea Count (EBC) and pH for milk sampled from producer were (9.82 log cfu/ml), (4.03 log cfu/ml), (4.15 log cfu/ml) and (6.15), respectively. However, the mean Coliform Count and pH was significantly differ those of milk samples from Dega and Woina Dega. Generally, the mean values of Aerobic Mesophilic Bacterial Count, Coliform Count and Entrobacteriacea Count observed from current study were above maximum acceptable limits. The milk produced from study area should be pasteurised and adequate sanitary measures taken at all stages of production to consumption of the milk to ensure the production of good quality raw milk.

**Keywords**: Raw Milk, Microbial quality, Cow, Ethiopia, Ezha
*Aberra Melesse¹,², 2014. Significance of scavenging chicken production in the rural community of Africa for enhanced food security, World’s Poultry Science Journal, 70(3): 593-606

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Abstract: The importance of scavenging chicken production in the national economy of developing nations of Africa and its role in improving the nutritional status and income of many smallholder farmers has been recognized by scholars and policy makers. Scavenging chicken production is a profitable enterprise that contributes to poverty reduction of rural communities. It is particularly suitable to smallholder farmers due to low capital investment, high cost efficiency, flexible production systems and low production risks. It has also a symbolic significance within the context of socio-cultural as well as religious functions and economically empowers the rural youth and women. Chicken meat and eggs provide a readily available, high-quality source of proteins, vitamins and micronutrients which are particularly essential for children, pregnant women and nursing mothers. Moreover, meat and egg from scavenging chicken present one of the most environmentally efficient animal protein production systems. The major challenges of the scavenging chicken production in Africa include high chicken mortality due to predation (poor or no housing) and the incidence of disease, notably Newcastle disease; poor nutrition due to poor quality and quantity of feed materials; lack of organized marketing system and poor genetic potentials. The growing demand for scavenging chicken products in the urban and periurban areas, promoting the use of locally available ethno-veterinary medicines, developing appropriate housing structures to control predators, up-grading the genetics of scavenging chickens, organizing farmers to increase bargaining power and shortening the marketing chain are considered as the major opportunities for the improvement of scavenging chicken production. The importance of indigenous chickens to subsistence farmers in African countries combined with many consumers’ preference for their eggs and meat suggests that these genetic resources are promising options for food security in the rural communities.

Key words: Africa; Food security; Rural community; Scavenging chicken


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Abstract: This study evaluates the nutrient composition and in vitro fermentation characteristics of deseeded green pods of Moringa stenopetala and Moringa oleifera cultivated at low and moderate altitudes. Crude protein (CP) content (g/kg DM) varied from 103 in Moringa oleifera to 135 in Moringa stenopetala. The CP contents for Moringa stenopetala cultivated at low and moderate altitudes were 135 and 127 g/kg DM, respectively. The CP values for Moringa oleifera were 103 and 105 g/kg DM at low and moderate altitudes, respectively. Low values of neutral detergent fibre, acid detergent fibre, and cellulose were found in Moringa stenopetala. High concentrations of Ca, P, K, Mg, Mn, and Cu were observed in Moringa oleifera. Significantly high values of metabolizable energy (ME), organic matter digestibility, and short-chain fatty acids were found in Moringa stenopetala. These values were also significantly high at moderate altitude. The ME values were 7.35 and 5.80 MJ/kg DM for Moringa stenopetala and Moringa oleifera, respectively. In conclusion, deseeded pods of the Moringa tree could be used as an alternative, cheap source of home-grown energy supplements for low quality crop residues of tropical livestock while using the seeds for human consumption.

Key Words: in vitro gas production, nutrient compositions, Moringa oleifera, Moringa stenopetala, deseeded Moringa pods

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**Abstract:** This study presents the feeding values of leaves, seeds and seeds-removed pods of *Moringa stenopetala* for ruminants as evaluated by *in vitro* gas production technique. Feed samples were analyzed for proximate nutrients using official methods. Each feed samples (200 mg) were incubated in buffered rumen fluid for 96 h and fermentation characteristics were estimated using established *in vitro* gas production models. Metabolizable energy (ME), organic matter digestibility (OMD) and short chain fatty acids (SCFA) were calculated from corrected 24 h gas production data. The gross energy content (MJ/kg DM) was 24.9, 18.6 and 16.8 for seeds, leaves and seeds-removed pods, respectively. The crude protein ranged from 11.2% in seeds-removed pods to 39.5% in seeds, the average being 16.8%. The sugar content was 10.7 and 7.3% for leaves and seeds respectively. The OMD value was highest in leaves (74.3%) followed by seeds (52.3%) and seeds-removed pods (38.1%). The highest SCFA (103 mmol) was obtained from leaves and the lowest from seeds-removed pods (31 mmol). The ME (MJ/kg DM) ranged from 4.15 in seeds-removed pods to 9.94 in leaves. The average gas production from insoluble but with time fermentable fraction was 53.0, 32.4, and 26.1 ml/200 mg DM for leaves, seeds and seeds-removed pods, respectively. *In vitro* gas volumes at various incubation times were positively correlated with ash, sugar, nitrogen free extract and non-fiber carbohydrate; while they were negatively correlated with cellulose, hemicelluloses, neutral and acid detergent fibers. In conclusion, *Moringa stenopetala* leaves can be used as potential sources of protein and energy supplements to tropical livestock feeding system by replacing expensive conventional feed resources.

**Key words:** Chemical compositions, feeding values, *in vitro* gas production, leaves, *M. stenopetala*, seeds, seeds-removed pods


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**Abstract:** The prime objective of this study was to evaluate the effective utilizable crude protein (uCP) in leaves, whole and seeds-removed pods of *Moringa stenopetala* and *Moringa oleifera* using ruminal fluid *in vitro*. Samples were analyzed for proximate nutrients using official methods. The metabolizable energy (ME), organic matter digestibility (OMD), short chain fatty acids (SCFA) and effective uCP were estimated using the Hohenheim *in vitro* gas test method. The CP contents (g/kg DM) ranged from 104 in seeds-removed pods to 289 in leaves of *M. oleifera*. The highest gross energy (MJ/kg DM) was obtained from whole pods (18.0) and the lowest from leaves (16.8) of *M. oleifera*. Leaves and seeds-removed pods of *M. stenopetala* had significantly (p<0.05) high gas volume, ME, OMD and SCFA than those of *M. oleifera*. Average effective uCP was 164 and 192 g/kg DM for leaves and 141 and 130 g/kg DM for whole pods of *M. stenopetala* and *M. oleifera*, respectively. In seeds-removed pods, average values of effective uCP were 118 and 84.7 g/kg DM for *M. stenopetala* and *M. oleifera*, respectively. This study suggested that leaves and pods could be used as alternative protein and energy sources for ruminants during dry periods in the tropics. We recommend further studies on anti-nutritional factors of green pod feed materials.

**Keywords:** *In vitro* gas production; Leaves; Rift valley; Seeds-removed pods; Utilizable crude protein; Whole pods

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Abstract: An experiment was conducted on forty-eight female chickens from each of the following genotypes: Naked-neck (Na, from Ethiopia), New Hampshire (NH), Lohmann White (LW) and F crosses of NaxNH and 1 NaxLW. Twenty four chickens from each genotype were randomly divided and assigned either to high (30-32 °C) or normal ambient temperature (18-20 °C). Body weights were measured during 20 and 68 weeks of age. Eggs were collected once daily while egg weight and feed intake were determined at 28-d intervals. Blood samples were taken from 12 randomly selected birds per genotype and ambient temperature at 38, 51 and 65 weeks age. Total protein levels were measured in plasma whereas differential leukocyte counts were determined from whole blood. Compared with controls, the egg production and feed consumption in commercial layers significantly reduced by 24.2 and 15%, respectively. Surprisingly, heat stress favourably increased body weight in NaxLW genotype by 1.7 and 2.8 % at 20 and 65 weeks, respectively and appeared to be the best F cross combinations. The effect of heat stress was significant for all differential leukocyte counts. Compared with controls, the respective increase in heterophil, basophil and monocyte counts was 19.2, 43.6 and 41% whereas the lymphocyte and eosinophil numbers reduced by 9 and 11.6%, respectively. The heterophil:lymphocyte (H/L) ratio increased by 45, 18 and 19% at 38, 51 and 65 weeks age, respectively. At high temperature, the highest lymphocyte counts were noted in LW and the lowest in NaxNH whereas heterophil counts were highest in NH and NaxNH resulting in increased H/L ratio. The total plasma protein reduced in all heat stressed chickens although it was only significant at 38 weeks age. It was inferred that the total plasma protein mean values in heat stressed hens declined from 4.12 g/dl at 38 weeks to 2.22 g/dl at 65 weeks. In conclusion, the Na and its F crosses demonstrated better heat stress tolerant than commercial layer chickens as evidenced by measured performance and physiological parameters. These results suggested that differential leukocyte counts, H/L ratio and total plasma protein could be used as a reliable indicator of long-term heat stress in layer chickens.

Key words: Commercial layer chickens, F crosses, Heat stress, Leukocyte counts, Naked-neck chicken, Total plasma protein


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5Gambela ATVET College, Gambella Regional State, Ethiopia.
6Ministry of Agriculture and Rural Development, Kembata-Tembaro Zone, Ethiopia.

Abstract: This study was conducted to describe variations in morphometrical traits and determine the usefulness of some linear body measurements in predicting body weight (BW) of indigenous sheep populations reared in KmbabataTembaro-Hadiya (KTH), Wolaita (WOL), Gamogofa (GAG), Gurage-Silti (GUS) and Sidama-Gedeo (SIG) zones of Southern Region of Ethiopia. Data were obtained from 2712 sheep that were drawn from 928 households. The BW and height at withers (HW) in WOL and SIG ewes aged 1-2 years was significantly high compared to others. High chest girth (CG) values were obtained from SIG, GAG, and GUS ewes. Ewes of SIG, WOL, KTH and GAG had significantly high body length (BL). Significantly high CG values were obtained from SIG and GAG ewes. Rams of WOL, KTH and GUS had significantly high BW, BL and HW. Body weight of KTH, WOL and GAG ewes aged 1 year and above 2 years and rams is better estimated using CG alone. However, the best predictor for KTH, WOL and GAG ewes aged 1-2 years old were CG, HW and BL. In conclusion, CG was the primary variable to explain most of the variations in BW and can be used as reliable predictor for studied sheep types. SIG and WOL sheep had a relatively large body frame and emphasis may be given for their improvement.

Key words: Morphometrical characters, Body weight estimation, Indigenous sheep, Southern Ethiopia
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*Aberra Melesse¹,², Dotamo E¹, Banerjee S¹, Berihun K¹, and Beyan M¹, 2013. Studies on Carcass Traits, Nutrient Retention and Utilization of Koekoeck Chickens Fed Diets Containing Different Protein Levels with Iso-Caloric Ration, Journal of Animal Science Advances, 3(10): 532-543

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**Abstract:** The study was conducted to investigate the effect of different levels of crude protein (CP) on some linear body measurements, carcass characteristics and nutrient retention of Koekoeck chickens. Two hundred chicks were randomly assigned to 4 treatment diets (T) containing 16% CP (T1), 18% CP (T2), 20% CP (T3) and 22% (T4). Each of the treatment groups were replicated 4 times with ten chicks per replicate. Linear body measurements (breast angle, keel length, shank length and body length) were taken at the ages of 3, 6, 9, 12 and 15 weeks. At the end of the experiment, a pullet and a cockerel after overnight fasting were slaughtered from each of the replicate to assess the carcass traits and nutrient retention. Breast angle and keel length were higher for chickens fed T1 and T2 than those on T3 and T4. Positive (P < 0.01) correlations were observed between linear body measurements and body weight. The commercial carcass yield was significantly higher for chicks receiving T3 diet when compared to those reared on T1 diet. Cockerels receiving T3 diet had higher (P<0.05) values for drumsticks, thighs, wings, breast and back. However, the pullets had higher (P < 0.05) weight for abdominal fat. Protein intake and retention increased linearly with the levels of crude protein and was higher (P <0.05) among the chickens receiving T3 diet. The feed intakes and energy retention also increased with the levels of crude protein in the diet. The highest protein utilization efficiency was observed in the chickens fed on T3 diet while the lowest was among those reared on T4 diet. The values for energy utilization efficiency was highest among the chickens receiving T2 and T3 diets while the reverse was true for those reared on T1 diet. The intake of calcium was highest among the chickens receiving T2 diet whereas the levels of phosphorous were similar across all the treatments. It can be concluded that the amount of dietary crude protein levels which is most advantageous for Koekoeck chickens under tropical production environments is 18%.

**Key words:** Carcass traits, crude protein levels, koekoeck chickens, linear body measurements, nutrient retention, nutrient utilization.

*Aberra Melesse¹,², Girma Abebe¹, Roger Merke¹,², Arthur Goetsch², Lionel Dawson², Terry Gipson² and Tilahun Sahlu³, 2013. Effect of Body Condition Score and Nutritional Flushing on the Reproductive Performances of Spanish and Spanish x Boer Crossbred Does, Ethiopian Journal of Agricultural Science, 24: 141-153

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**Abstract:** The objective of this experiment was to evaluate the effect of body condition score (BCS) and short-term supplementation with high levels of energy and protein sources on the reproductive performance of 180 does consisting of 90 Spanish and 90 Spanish x Boer (60 ½ Boer = F1-cross; and 30 ¾ Boer = F2-cross) genotypes. Each of the 3 genotypes was equally distributed to treatments of 2 body condition groups (BCG, low and high) and 3 flushing treatments consisting of no supplementation (control), supplementation with protein mixture (PM) alone and PM + ground corn (PE) in a 2 x 3 x 3 factorial arrangement of treatments. The flushing period lasted 11 days, after which does were exposed to sexually active Boer bucks for 42 days. The results indicated that although not significant, flushing with PM and PE diets numerically increased the body weight and body condition score of all genotypes in high BCG. In low BCG, flushing with PM and PE diets significantly (p<0.05) increased the body weight of F1-cross and Spanish does, respectively. Moreover, in low BCG, flushing with PE diet significantly (p<0.05) increased the BCS values by 26.7%, 18.1% and 29% in Spanish, F1- and F2-crosses, respectively. Similarly, flushing with PM diet significantly (p<0.05) increased the BCS values in Spanish and F1 genotypes by 19.6% and 10.7%, respectively. In the high BCG, the Spanish and F1-cross does flushed with PE diet had significantly (p<0.05)
higher pregnancy and multiple birth rates than F2 genotype. In the low BCG, the pregnancy and kidding rates of Spanish does flushed with PM diet was significantly (p<0.05) higher than those of F2-cross. The F2-cross supplemented with PM and PE diets had significantly (p<0.05) higher multiple birth rates than both Spanish and F1-cross. Litter size was significantly (p<0.05) higher for F1 and F2-crosses supplemented with PE diet. The progesterone concentration was significantly (p<0.01) lower in all genotypes before breeding than observed after mating. In conclusion, flushing with protein and energy sources for short period of time was found to be beneficial for improving the body weight and body condition score and subsequently, the reproductive efficiency of does under poor body condition.

Key words: Body condition score, body weight, Bore goats, nutritional flushing, reproductive traits, Spanish goats, SpanishxBoer crossbreeds


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Abstract: This study was conducted to evaluate the chemical and mineral compositions of whole and seeds-removed fresh pods of Moringa stenopetala and Moringa oleifera. Feed samples were collected from five trees of each Moringa species and analyzed for chemical and mineral compositions using standard methods. The results indicated that whole fresh pods of both Moringa species contained significantly (p<0.05) higher crude protein (CP) and fat values than seeds-removed pods. The highest CP (182 g/kg DM) was obtained from whole fresh pods of M. stenopetala while the lowest from seeds-removed fresh pods of M. oleifera (104 g/kg DM). In both Moringa species, seeds-removed fresh pods contained significantly (p<0.05) higher crude fiber, neutral detergent fiber, cellulose and hemicellulose than that of whole fresh pods. In M. stenopetala, calcium content was 3.72 and 2.98 g/kg DM in whole fresh pods and seeds-removed fresh pods, respectively. In M. oleifera, whole and seeds-removed fresh pods contained 3.34 and 2.74 g/kg DM calcium, respectively which differed significantly. In both Moringa species, the concentrations of phosphorous, magnesium and zinc in whole fresh pods were significantly (p<0.05) higher than those found in seeds-removed fresh pods. High zinc and iron concentrations were found in whole and seeds-removed fresh pods of both Moringa species, respectively. Both whole and seeds-removed fresh pods of M. oleifera had high copper values (9.3-9.7 mg/kg DM) compared with those of M. stenopetala (4.8-5.8 mg/kg DM). In conclusion, the fresh pods of both Moringa species could be used as alternative protein supplement sources for feeding ruminant and monogastric animals during dry periods of the year.

Key words: Gamogofa zone; Moringa pods; Chemical composition; Mineral composition


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Abstract: The objective of this study was to evaluate the effects of the interaction between chicken genotypes (Naked-neck, Na, from Ethiopia; New Hampshire, NH; Lohmann White, LW; and F1 crosses of Na males with females of NH [Na×NH] and LW [Na×LW]) and ambient temperatures (normal and high) on physiological indicators and performance traits. Two-hundred forty female chickens were assigned to a completely randomized design of 2 × 5 factorial arrangements (2 temperatures and 5 genotypes). Eggs were collected daily while feed intake was determined at 28-d intervals and egg shell thickness at 4 age points. Corticosterone (CS) and 3,5,3′-triiodothyronine (T3) levels were determined from 480 blood samples taken...
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at 4 age points. Commercial hens reared at high temperature showed significant (p<0.05) performance reductions in egg production (33%), feed intake (15%) and shell thickness (24.3%). The effect of heat stress on T3 levels was significant (p<0.001) and consistent across heat-stressed genotypes resulting in an overall reduction of 29% compared with those reared at normal temperature. Moreover, significant (p<0.05) differences in plasma T3 levels were observed between heat-stressed genotypes. Although the CS levels uniformly increased due to heat stress, the response of genotypes with advancing age was inconsistent. In conclusion, the Na LW crosses at high temperature outperformed other genotypes and thus, appeared to be suitable genetic combinations. The Na chickens and their F1 crosses demonstrated reduced thyroid gland activity suggesting improved thermo-tolerance to long-term heat-exposure. The present findings suggest that levels of T3 hormone might be considered as reliable indicator of long-term heat stress in chickens.

**Key words:** 3,5,3-triiodothyronine, corticosterone, F1 crosses, heat stress, Naked-neck Chicken


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**Abstract:** This study was conducted to test the thermo-tolerance ability of five commercial chicken genotypes (Lohmann Brown, LB; Lohmann White, LW; New Hampshire, NH; White Leghorn selected for improved feed efficiency, WL-FE and dwarf White Leghorn, WL-dw) under long-term heat exposure. Two-hundred forty female chickens were assigned to a completely randomized design in a 5 × 2 factorial arrangement (five genetic groups and two ambient temperatures [thermo-neutral, 18-20 °C; heat stress, 30-32 °C]). Individual eggs were collected on daily basis while egg weight and feed intake were determined on individual and group basis at 28-days intervals, respectively. Shell quality traits were determined at 25, 40 and 56 weeks age. No Genotype x ambient temperature interactions were found except for body weight and egg deformation. Chickens at thermo-neutral temperature produced significantly heavier eggs than those of heat-exposed (60 g vs. 54 g). Hen-housed egg production of controlled chickens was significantly higher than those of heat-stressed (76.8% vs. 66.2%). Daily egg mass production at thermo-neutral and heat stressed chickens was 46 g and 35.8 g, respectively. Feed consumption in heat-stressed and thermo-neutral chickens was 109 and 80.8 g, respectively. Shell thickness, breaking strength and Haugh units were significantly reduced in heat-stressed chickens. Among heat-exposed chickens, the NH had the highest body weight while the LW produced 10% more eggs than the group average. The heat-induced effect on shell quality traits was lowest in LW chickens. The results from this study indicated that the magnitude of heat stress was breed dependent in which LW and NH genotypes demonstrated improved thermo-tolerance.

**Key words:** Commercial layer chickens, egg quality traits, egg production, heat stress, thermo-neutral temperature, thermo-tolerance.


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Abstract: The objective of this study was to evaluate the effects of genotype x temperature interactions on hormonal heat stress indicators and performance traits. Two-hundred forty female one-day-old chicks were randomly assigned to a completely randomized design in a 5x2 factorial arrangement with 5 genotypes (Naked-neck, Na, from Ethiopia; New Hampshire, NH; Lohmann White, LW and F1 crosses of Na with NH and LW) and 2 ambient temperatures (thermo-neutral, 18-20°C; heat stress, 30-32°C). Blood samples were taken from 12 randomly selected birds per genotype and ambient temperature at 22, 38, 51 and 65 weeks of age. Levels of corticosterone (CS) and 3,5,3′-triiodothyronine (T3) were determined in blood plasma. Heat stress effects on egg production traits were most severe in LW and NH, least severe in Na and Na × LW, intermediate in Na × NH. Plasma T3 level was significantly reduced by 27.9% in heat stressed genotypes. Plasma CS increased by 12.6% in heat exposed genotypes. However, inconsistent responses of CS and T3 levels were observed at different ages. The Na and their F1 crosses demonstrated relatively better thermo-tolerance than LW and NH hens. Levels of plasma T3 hormone might be considered as indicator of long-term heat stress in hens.

Key Words: Naked-neck chicken, F1 crosses, heat stress, genotype x temperature interaction, corticosterone, 3,5,3′-triiodothyronine

*Aberra Melesse¹, Maak S², Schmidt R³. and von Lengerken G³., 2011. Effect of long-term heat stress on some performance traits and plasma enzyme activities in Naked-neck chickens and their F1 crosses with commercial layer breeds, Livestock Science, 141: 227-231

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Abstract: The objective of this study was to investigate the effect of long-term heat stress on performance traits and plasma enzyme activities in Naked-neck (Na) chickens and commercial breeds (New Hampshire, NH and Lohmann white, LW) with their F1 crosses (NaxNH and NaxLW). A total of 240 female chickens were randomly assigned to a completely randomized design in a 5x2 factorial arrangement (five genetic groups and two ambient temperatures: high=30–32 °C; normal=18–20 °C). Body weights were measured at 20 and 68 weeks of age. Eggs were collected once daily while egg weight and feed intake were determined at 28-d intervals. Blood samples were taken from 12 randomly selected birds per genotype and ambient temperature (12 out of 24 hens) at 22, 38, 51 and 65 weeks age. Levels of glutamic–pyruvic transaminase (GPT), glutamic–oxaloacetic transaminase (GOT) and creatine kinase (CK) were determined in blood plasma. Compared with controls, the commercial hens showed significant (p<0.05) performance reductions under thermal stress with respect to egg production (33%), egg mass (24.2%), feed intake (15%) and shell thickness (24.3%). At high ambient temperature, the NaxLW cross outperformed all other genotypes with respect to heat tolerance in body weight, egg number, egg weight, feed intake and shell thickness; and thus, appeared to be suitable genetic combinations. Compared with controls, heat stress significantly (p<0.05) increased CK, GPT and GOT activities in all genotypes. However, the response of heat stressed genotypes at different ages was inconsistent and variable. In conclusion, the present study showed that the Naked-neck chickens and their F1 crosses were more thermo-tolerant compared with commercial layer hens. Although plasma enzyme activities uniformly increased due to heat stress, the response of genotypes with age was inconsistent.

Key words: Commercial chicken breeds, Enzyme activities, F1 crosses, Heat stress, Naked-neck chicken


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Abstract: High environmental temperatures are the most important inhibiting factors to poultry production in hot regions. The objective was to test adaptive responses of different chicken genotypes to long-term high temperature and identify suitable indicators of physiological parameters. Forty eight female chickens from each genotype of Lohmann Brown (LB), Lohmann White (LW), New Hampshire (NH), White Leghorn selected for improved feed efficiency (WL-FE) and dwarf White Leghorn (WL-dw) were randomly assigned either to the control group (18 to 20°C) or to the experimental group (30 to 32°C). Blood samples were collected from randomly selected 12 birds of each genotype at three age points. Levels of glutamic-pyruvic transaminase (GPT), glutamic-oxaloacetic transaminase (GOT), creatine kinase (CK), lactate dehydrogenase (LDH) and 3,5,3¢-triiodothyronine (T3) were determined in plasma. The results indicated that compared to controls, the GPT activity in heat stressed chickens significantly increased by 29.2% in all genotypes. The CK activity in heat stressed chickens was only significantly higher at 22 weeks old. Activities of GOT and LDH were variable in all heat stressed chickens. The T3 concentration significantly reduced by 41% in all heat stressed chickens and the WL-dw had the lowest value. We concluded that T3 could be considered as reliable indicator of long-term heat stress. Moreover, LW and WL-dw genotypes demonstrated better heat tolerant.

Key words: Layer hens, long-term heat stress, enzyme activities, T3 concentration.


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Abstract: An experiment was conducted on forty eight female chicks from each of the following genotypes: Naked neck (Na, from Ethiopia), New Hampshire (NH), Lohman White (LW), and F1 crosses of Na x NH and Na x LW. The different genotypes were tested to assess the effect of long-term heat stress (30-32 °C) on performance traits. The female chicks were randomly divided into an experimental group (24 each) and a control group (24 each, ambient temperature18-20 °C). All hens were kept in individual cages up to 68 weeks of age. Two eggs from each hen were collected at 27, 43, 55 and 68 weeks of age for egg quality assessments. Eggshell quality traits of F1 crosses exposed to long-term heat stress did not significantly differ from control group. On the contrary, long-term heat stress significantly reduced eggshell quality traits of commercial chicken breeds (LW and NH). Under heat stress conditions, shell thickness, breaking strength, shell percentage and deformation for F1 crosses were much better compared to the average of heat stressed LW and NH breeds. The NaxLW cross kept at heat stressed environment exhibited better shell thickness and yolk quality traits associated with lower mortality compared with NaxNH cross. Both F1 crosses showed evidence of heat stress resistance as indicated by improved eggshell quality and low mortality traits.

Key words: Angete-Melata chickens, commercial chicken breeds, crossbreeds, eggshell quality, warm environment


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Abstract: An experiment was conducted on 48 forty-eight female chicks from each of the five (Angete-Melata, Naked neck Na; New Hampshire NH; Lohmann White LW); and F1 crosses (New Hampshire crosses Na NH; Lohmann White crosses Na LW) to assess the effect of long-term heat stress on performance traits. The female chicks were randomly divided into two groups and raised on floor pens in normal (18-20°C) and high (30-32°C) ambient temperatures up to the 20th week of age, after which they were transferred to a three-tiered system of individual cages in temperature-regulated houses and maintained in the same ambient temperatures up to the age of 68 weeks. The results revealed highly significant differences between Na and both F1 crosses in performance traits under heat stress conditions. Accordingly, the F1 crosses were superior to local Na hens for body weight, egg production, egg mass output, egg weight and feed efficiency. Age at sexual maturity for F1 crosses was significantly shorter than Na but comparable to the average of pure lines. The body weight of heat stressed F1 crosses was generally larger than Na and comparable to the average of pure lines. Percentage hen-day, hen-housed egg production and total egg number for F1 crosses under elevated temperature did not significantly differ from the control group indicating their capability to tolerate long-term heat exposure. The present findings suggest that the F1 crosses could be preferable to the local Na for improved egg production in hot regions.

Key words: F1 crosses, heat stress/high temperature, naked neck, performance traits, pure lines

*Aberra Melesse,1 Michael Bulang2 and Holger Kluth2, 2009. Evaluating the nutritive values and in vitro degradability characteristics of leaves, seeds and seedpods from Moringa stenopetala, Journal of the Science of Food and Agriculture, 89: 281-287

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Abstract:
Background: Moringa stenopetala is a multipurpose tree which has several agricultural, industrial and medicinal uses. The nutritive value of East African M. stenopetala has not been fully investigated and pertinent data for ruminants are lacking. The present study was therefore conducted to fill this gap by providing the latest information on chemical composition and in vitro fermentation of M. stenopetala tree parts.

Results: The respective metabolizable energy values for leaves, seeds and seedpods were 10.0, 7.0 and 5.1 g kg\(^{-1}\) dry matter (DM). The crude protein (CP) contents for leaves, seeds and seedpods were 395, 282 and 110 g kg\(^{-1}\) DM, respectively. For leaves and seeds, 88% and 83%, respectively, of the CP was true protein. Fat contents (g kg\(^{-1}\) DM) were relatively high in seeds (334) but not in leaves (84) or seedpods (110). No starch was detected in seeds. Leaves were a potentially useful source of calcium, sodium and manganese, containing 18.5, 4.1 and 0.086 g kg\(^{-1}\) DM, respectively. The concentrations of essential amino acids in leaves for leucine, valine, phenylalanine, isoleucine and threonine were 8.5, 5.3, 5.3, 4.5, and 4.4 g 16 g N\(^{-1}\), respectively, and were comparable to those found in soybean and Moringa olifera leaves. The contents of total phenols in seeds and leaves were 1.2 and 56.7 g kg\(^{-1}\) DM, respectively.

Conclusion: The chemical composition of leaves and seeds from M. stenopetala revealed its potential as a protein and energy supplement for ruminant livestock.

Key words: Moringa stenopetala, chemical composition, in vitro gas production, tree parts

*Aberra Melesse1, Misba Alewi2 and Yosef Teklegiorgis1, 2013. Evaluating the Reproductive and Egg Production Traits of Local Chickens and Their F1 Crosses with Rhode Island Red and Fayoumi Breeds under Farmers’ Management Conditions, Iranian Journal of applied animal science, 3(2): 379-385

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Abstract: This study was conducted at Beresa watershed district of Guraghe Administrative Zone, the southern Re-gional State of Ethiopia to evaluate the on-farm reproductive and egg production performances
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of local Kei and its F1 crosses with Fayoumi and Rhode Island Red (RIR) chicken breeds under farmers’ management. The local Kei paternal line was mated with maternal lines of Fayoumi and RIR chickens to produce F1-crosses. Twenty-four households were involved in the study who received 10 chicks from each 3 genotypes (total of 720 chicks). Three hay-box brooders fitted with chick-runs were provided to each household in which the three genotypes were reared. Eggs were collected on a daily basis and body weights were measured at 24, 34 and 52 weeks age. The highest egg fertility was observed in Fayoumi-crosses. The hatchability of total egg set and that of fertile eggs was higher for Fayoumi-crosses and local Kei chickens than for RIR-crosses. The Fayoumi (154 days) and RIR-crosses (161 days) reached age of sexual maturity earlier than local Kei chickens (183 days). The RIR-crosses were heavier (P<0.05) in body weight than Fayoumi-crosses and local Kei. The F1 crosses had significantly (P<0.05) higher rate of egg production on hen-day and hen-housed basis than local Kei chickens. The Fayoumi-crosses produced more (P<0.05) eggs than RIR-crosses. The F1 crosses produced significantly (P<0.05) higher total egg mass than local Kei chickens. Eggs from RIR-crosses were heavier (P<0.05) than Fayoumi-crosses and local Kei chickens. The F1 crosses reached their peak egg production at about 34 weeks of age while local Kei at 38 weeks. The Fayoumi-crosses had significantly higher hen-housed and hen-day egg production rates and survival ability than RIR-crosses. In conclusion, Fayoumi breeds could be a better strategy to upgrade the poor performance of in-digeneous chicken populations.

Key words: crossbreeding, Farmers management, Fayoumi chicken breed, local Kei chicken, Rhode Island Red chicken breed.


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Summary: Information on morphological characteristics is a prerequisite to sustainable breed improvement, utilization and conservation. The present study was initiated to describe the physical and morphological characteristics of indigenous sheep reared in Sidama-Gedeo Kembata Tembaro-Hadiya, Gurage-Silte, Gamogofa and Wolaita zones of Southern Regional State of Ethiopia. Data on the assessment of qualitative characters and linear body measurements were obtained from a total of 3966 sheep that were drawn from 928 households. The results indicated that the most common tail form in the Sidama-Gedeo, Kembata Tembaro, Hadiya, Gurage-Silte and Wolaita sheep was of long fat type ending with a straight tip, whereas that of Gamogofa sheep was long thin tail ending with a curve tip. Hair coat colour pattern was mainly plain followed by patchy. The common hair of sheep in all studied zones was short and smooth. Sheep from Sidama-Gedeo, Kembata Tembaro-Hadiya and Gurage-Silte were devoid of wattle and ruff. Rams of Gurage-Silte and Wolaita had higher (P<0.05) body weight values than those of other locations. Ewes of Sidama-Gedeo and Wolaita had relatively high (P< 0.05) body weight, whereas those of Gurage-Silte, Gamogofa and Wolaita had significantly high chest girth values. Gurage-Silte and Gamogofa rams had large (P < 0.05) chest girth values. The height at withers was high (P< 0.05) for both sexes in Sidama-Gedeo, Kembata Tembaro-Hadiya and Wolaita sheep. The highest body length was obtained from Wolaita rams, followed by Gamogofa and Kembata Tembaro-Hadiya rams, whereas the lowest body length was obtained from Gurage-Silte rams. Ewes of Sidama-Gedeo had higher (P< 0.05) body length values than those of other zones. The dendrogram indicated a close association among the sheep of Kembata Tembaro-Hadiya, Gurage-Silte and Sidama-Gedeo. However, sheep in Wolaita and Gamogofa were more distantly associated with those of the three zones. It can be concluded that the sheep in the study zones may possess unique adaptive features useful in designing sustainable sheep improvement strategies. However, a molecular-based genetic assessment of the population structure found in the study region might be given due consideration.

Keywords: phenotypic characterization, qualitative character, linear body measurement, indigenous sheep, Southern Regional State of Ethiopia.
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*Abera Melesse¹, Steingass H², Boguhn J², and Rodehutscord M², 2013. In vitro fermentation characteristics and effective utilisable crude protein in leaves and green pods of Moringa stenopetala and Moringa oleifera cultivated at low and mid-altitudes, Journal of Animal Physiology and Animal Nutrition, 97: 537-546

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Abstract: This study was conducted to assess the in vitro nutrient digestibility and utilisation of leaves and green pods of two Moringa species in supplementing the feed of ruminant animals during the dry season. Samples were analysed for proximate nutrients using official methods. The metabolisable energy (ME), organic matter digestibility (OMD) and effective utilisable crude protein (uCP) were estimated using the Hohenheim in vitro gas test method. Gas volume in Moringa stenopetala leaves and green pods was generally higher than those of Moringa oleifera. Gas volume for leaves was similar between low and mid-altitudes but was higher for green pods at mid-altitude. M. stenopetala leaves contained significantly higher ME (9.8 MJ/kg DM) and OMD (75%) than those of M. oleifera. Similarly, M. stenopetala green pods had higher ME and OMD values than those of M. oleifera. For green pods, the ME and OMD values were significantly higher at mid-altitude than those at low altitude although these values for leaves were similar between both altitudes. Moringa oleifera leaves had higher effective uCP than those of M. stenopetala. Nevertheless, the effective uCP was higher for green pods of M. stenopetala than those of M. oleifera. The effective uCP for leaves cultivated at mid-altitude was slightly higher than those at low altitude. This study suggested that leaves and green pods could be used as alternative energy and protein supplements for tropical ruminants, particularly during dry periods. It was further concluded that leaves were generally better in nutrient compositions and in vitro nutrient digestibility characteristics than green pods.

Key words: Altitude, green pods, in vitro gas production, leaves, Moringa species, utilisable crude protein

*Aberra Melesse¹, Steingass H², and Boguhn J², Schollenberger M², and Rodehutscord M², 2012. Effects of elevation and season on nutrient composition of leaves and green pods of Moringa stenopetala and Moringa oleifera, Agroforestry Systems, 86: 505-518

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Abstract: Moringa stenopetala and Moringa oleifera are multipurpose trees widely grown in the tropics and sub-tropics. The aim of this study was to investigate the variability in nutritive values of leaves and green pods of M. stenopetala and M. oleifera as influenced by species, elevation and season. Leaves and green pods were collected from each three trees of M. stenopetala and M. oleifera grown at two different elevations in rainy and dry seasons. In leaves, crude protein (CP) content (g/kg DM) averaged 263 in M. stenopetala and 290 in M. oleifera. In green pods, the highest and lowest CP concentrations (g/kg DM) were 184 and 153 for M. stenopetala at low and mid elevations, respectively. Leaves contained higher fat concentration than green pods. Compared to leaves, green pods had a high level of structural carbohydrates. At low elevation, the concentrations of calcium (Ca), phosphorus (P), potassium (K), magnesium (Mg) and trace minerals zinc (Zn) and copper (Cu) were highest whereas that of sodium (Na) and trace mineral manganese (Mn) were lowest in M. stenopetala leaves compared to those of M. oleifera. Green pods of M. oleifera contained higher concentrations of P and trace minerals iron (Fe), Mn, Zn and Cu. Leaves contained greater concentrations of essential amino acids than green pods and levels generally were comparable to concentrations found in soybean. In leaves, except for lysine and arginine, essential amino acid concentrations were similar across Moringa species. Except for aspartic acid, phenylalanine and serine, amino acid concentrations in M. stenopetala leaves at mid elevation were higher than those at low elevation. However, the amino acid concentrations in M. oleifera leaves were similar between low and mid elevations. In conclusion, leaves and green pods could serve as valuable sources of protein supplement for ruminants in the tropics during the dry season. Moreover, due to their excellent amino acid profiles, leaves could be used as potential sources of feed for non-ruminants and humans.

Key words: Moringa species, Nutrient composition, Leaves, Green pods, Elevation, Season
Phenotypic and morphological characterization of indigenous chicken populations in southern region of Ethiopia, Animal Genetic Resources, 49:19-31

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Abstract: Phenotypic characterization of indigenous chicken resources is a prerequisite for their rational utilization. Data were collected from 748 randomly selected households (HHs) using structured questionnaires. Visual appraisal was conducted to study morphological traits of indigenous chicken populations. Quantitative data were collected on body weight and shank length from both sexes. The results indicated that 55.0 percent of chicken populations were single combed followed by rose (28.5 percent) and pea (15.2 percent) combs. Yellow was the major shank colour (52.5 percent), followed by white (29.1 percent) and black (14.7 percent). About 46.4, 34.2 and 19.4 percent of chicken populations exhibited red, white and yellow earlobes, respectively. The predominant plumage colour was Kei (36.6 percent) followed by Tikur (20.7 percent), Gebsima (15.3 percent), Netch (12.3 percent), Kokima (8.4 percent), Wosera (3.7 percent), Zigrima (1.7 percent) and Zagolima (1.3 percent). The highest adult body weight was found in Naked-neck chickens (1.7 kg), followed by Kei (1.5 kg), Gebsima (1.45 kg) and Wosera (1.46 kg). The Naked-neck and Wosera males had the longest shank of 115 and 113 mm, respectively. Kei male chickens had large body weight shank length ratio compared with other indigenous chickens. The present study suggests that indigenous chicken populations might possess useful genetic potentials for improved productivity under scavenging feed resource-based production systems.

Key words: phenotypic characterization, indigenous chickens, Southern Ethiopia, administrative zones, agroclimatic zones

Nutrient composition and effects of feeding different levels of Moringa stenopetala leaf meal on carcass traits of Rhode Island Red dual-purpose grower chickens, Ethiopian Journal of Animal Production, 12(1): 37-50

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Abstract: Fourteen days-old Rhode Island Red (RIR) chicks were used to evaluate effects of Moringa stenopetala leaf meal (MSLM) on carcass characteristics. Ten chicks were assigned to each of 3 replicates of 4 treatment (T) diets (T1, T2, T3, T4, containing 0, 2.0, 4.0 and 6.0% MSLM, respectively, having 18.8-19.9% CP). The nutrient composition of the MSLM was analyzed using standard methods. After 60 days of adlib feeding, 2 male and 2 female chicks per replication were fasted overnight, killed and body parts weighed. The results revealed that MSLM (on DM basis) contained 95.6% dry matter, 11.8% ash, 8.3% crude fiber, 30.6% crude protein, 4.7% fat, 40.2% nitrogen free extract, 2.1% calcium, 0.37% phosphorous and 2992 kcal metabolizable energy. Average slaughter weight was 634, 636, 641 and 659 g for T1, T2, T3 and T4, respectively. Total edible parts weighed 377, 398, 405 and 422 g for T1, T2, T3 and T4, respectively. The breast weight of T1, T2, T3 and T4 was 68.9, 77.8, 78.9 and 93.1 g, respectively. Treatment 4 had significantly (p<0.05) higher breast, drumsticks and neck weights than T1. The MSLM levels and sex of the birds did not influence dressing percentage. Male chicks had significantly (p<0.05) higher slaughter weights and edible carcass parts than females. Best results of carcass traits were obtained at 6.0% MSLM inclusion level. However, further investigation is needed to establish the optimum level of MSLM in grower dual-purpose chicks.

Key words: M. stenopetala leaf meal; Rhode Island Red chicks; Nutrient composition; Edible carcass; Non-edible carcass

Effects of feeding moringa stenopetala leaf meal on nutrient intake and growth performance of rhode island red chicks under tropical climate, Tropical and Subtropical Ecosystems, 14: 485-492

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Abstract: The effects of *Moringa stenopetala* leaf meal (MSLM) on nutrient intake and weight gain (WG) were evaluated. Forty unsexed Rhode Island Red chicks were randomly assigned to 4 treatment groups. The control diet (T1) (MSLM 0%), the experimental diets contained MSML at a rate of 2% (T2), 4% (T3), and 6% (T4) of the diets (as fed basis) to replace 3%, 5.9% and 8.8% of the crude protein (CP) of the control diet. Daily feed, dry matter and CP intake of the chicks fed MSLM diets were higher (p<0.05) than those fed the control diet. Average weight gain (AWG) of birds fed MSLM diets were higher (p<0.05) than those fed the control diet. Chicks fed T4 showed higher (p<0.05) AWG than those on T2 and T3. Feed efficiency ratio (FER, g gain/g feed intake) and protein efficiency ratio (PER, g gain/g CP intake) were higher for chicks fed MSLM. MSLM elicited no deleterious effects in the birds. The results indicated that MSLM is a potential plant protein supplement and could be included to 6% in the diet of grower chicks to substitute expensive conventional protein sources.

Key words: *Moringa stenopetala* leaf meal, Rhode Island Red chicks, nutrient intake, growth performance


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Abstract: The effects of *Moringa stenopetala* leaf meal (MSLM) on nutrient intake and weight gain (WG) were evaluated. Forty unsexed Rhode Island Red chicks were randomly assigned to 4 treatment groups. The control diet (T1) (MSLM 0%), the experimental diets contained MSML at a rate of 2% (T2), 4% (T3), and 6% (T4) of the diets (as fed basis) to replace 3%, 5.9% and 8.8% of the crude protein (CP) of the control diet. Daily feed, dry matter and CP intake of the chicks fed MSLM diets were higher (p<0.05) than those fed the control diet. Average weight gain (AWG) of birds fed MSLM diets were higher (p<0.05) than those fed the control diet. Chicks fed T4 showed higher (p<0.05) AWG than those on T2 and T3. Feed efficiency ratio (FER, g gain/g feed intake) and protein efficiency ratio (PER, g gain/g CP intake) were higher for chicks fed MSLM. MSLM elicited no deleterious effects in the birds. The results indicated that MSLM is a potential plant protein supplement and could be included to 6% in the diet of grower chicks to substitute expensive conventional protein sources.

Key words: *Moringa stenopetala* leaf meal, Rhode Island Red chicks, nutrient intake, growth performance


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Abstract: The aim of the present study was to evaluate *Moringa stenopetala* leaf meal(MLM)as alternative cheap source of protein in the diets of grower Koekoek chicken breeds. Two hundred 15-day old chicks were randomly assigned to five dietary treatments consisting of a control diet (T1) and those containing MLM at the levels of 50g/kg (T2), 80g/kg (T3), 110g/kg (T4) and 140g/kg (T5) replacing the roasted soybean of the control diet. The experimental period lasted for 14 weeks inclusive of 2weeks of diet adaptation. The results indicated that chickens reared on diets containing MLM consumed more (p<0.01) feed than those of the control diet. Therewere no significant differences infeed conversion ratio among treatment diets except in those fed T5 which had the lowest value. Chickens fed on T2, T3 and T4 had higher (p<0.01) weight gain and final body weight values than those fed T1 and T5 diets. Chickens fed T3, T4 and T5 diets had higher (p<0.01) weights of dressed carcass, thighs, drum sticks and wings than those of the control diet (T1). Significantly (p< 0.01) higher slaughter weight was obtained from chickens fed T3 and T4 diets than those of T1. Chickens fed T4 and T5 diets had the highest dressing and breast yields which differed (p<0.01) from the other treatment diets. Serum total protein levels increased (p< 0.05) in chickens fed MLM. The values of
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serum alanine transaminase and of serum urea were reduced (p< 0.05) in chickens fed T3 and T4 diets. It can be concluded that *Moringa stenopetala* leaf meal could be used as alternative cheap source of protein for the emerging poultry industry of tropical regions.

**Key words:** *Moringa stenopetala* leaf meal, Keokoekchicken, Growth traits, Carcass traits, Biochemical parameters


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**Abstract:** A survey based experiment was conducted from November 2010 to April 2011 in 196 households to assess egg handling and qualities of scavenging chickens reared in highland, midland and lowland agro-ecological zones of Amhara Regional State, Ethiopia. For egg quality determination, among 196 households, 30 of them who keep only local chickens were identified from each agro-ecology from which 588 eggs (196 eggs from each agro-ecology) were collected. The flock size in highland, midland and lowland agro-ecologies was 8.5, 7.4 and 8.4 chickens, respectively. The results indicated that about 95% and 70% of the respondents fumigate day old chicks with smoke and clip tail feathers, respectively. The average age at first egg lay was 6.94, 6.43 and 6.57 months for highland, midland and lowland agro-ecologies, respectively. The survivability of chickens in highland, midland and lowland agro-ecological zones was 55.0%, 61.4% and 55.1%, respectively. On the average 79.1% hatchability, 58.3% chick survivability was found in the study area. The observed values of egg weight, egg length, egg width, yolk height, albumen height and Haugh unit were significantly (p< 0.05) different between the investigated agro-ecologies. Accordingly, all these traits were (p< 0.05) higher in midland than those of highland and lowland agro-ecological zones. Agro-ecology did not affect shape index, shell thickness, yolk width and yolk index values. The respective average egg weight, shell thickness and shape index values were 39.6 g, 0.296 mm and 73.2%. The average values of yolk height, yolk width and Haugh unit were 16.1 mm, 36.8 mm and 73.2, respectively. In conclusion, the midland agro-ecological system appears to favor the survivability and expression of external and internal egg quality traits of scavenging rural chickens.

**Key words:** Agro-ecological zones, egg handling, egg quality traits, rural households, scavenging chickens


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**Abstract:** The study was conducted at *Bahir Dar Zuria* and *Woreta* in the northern Ethiopia, Amahara National Regional State. on *L. sativus*. The local grass pea variety, was planted on different times starting from 4th week of September to 1st week of November to study the pea aphid, *A. pismum* population fluctuation and its effect on performance of grass pea on different locations during cropping seasons of 2009-10 and 2010-11 under insecticidal treatments and different sowing dates. Both at *Bahir Dar Zuria* and *Woreta* aphid density increased exponentially between 60DAE to 120DAE and then declined starting from 135DAE up to the crop ready to harvest. Likewise, mean pea aphid density and pea aphid days in the first cropping season were significantly higher than second cropping season and un protected plots support significantly higher number of pea aphids than protected. Besides that, pea aphid density and pea aphid days of all cropping seasons were higher at *Bahir Dar Zuria* than *Woreta*. Data revealed that pea aphid density, pea aphid days, grass pea damage per cent, biomass weight, and grain yield were highly significant (at P = 0.001 and alpha =0.05) over location, season, insecticidal treatment and variation in crop growth stages. Crop damage per cent of unprotected plots (42–53%) at *Bahir Dar Zuria* was highly significant than protected plots (16–20%)
in all cropping season and the first two sowing dates (Early and Mid). On the other hand, at Woreta though the crop damage per cent on unprotected plots (11–26%) was higher than protected plots (8.3–20%), there is no significant difference between cropping season as well as variation in sowing dates. Similarly, biomass and grain yield obtained from unprotected plot at Bahir Dar Zuria was highly significant than protected plots. At Woreta, the biomass and grain yield trend was similar though there was no significant difference between protected and unprotected plots and sowing date variation. The biomass and grain yield loss incurred at Bahir Dar Zuria ranged 15.42–47.3% per cent and 24. 45–93.87% per cent, respectively whereas at Woreta the loss was very less but in similar trend as per season and sowing date variation, which ranged from 5.3–26.5% and 4.6–69.33%, respectively. Regression analysis of pea aphid days with crop damage percent showed significantly direct relationship. Similarly, biomass weight with grain yield shows significantly direct relationships. However, regression analysis of mean pea aphid density and pea aphid days with biomass weight and grain yield shows significantly inverse relationship.

**Key words**: Grass pea, Lathyrus sativus, Pea aphid, Acrythosiphon pisum, Harris and pea aphid days


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**Abstract**: Natural pastures and crop residues are the main feed resources in most developing countries. However, such feed resources cannot sustain effective animal production or even maintenance because of their inherent nutrient deficiencies, low digestibility and limited intake capacity of animals. Supplementation of animals fed low quality roughages with small quantities of high quality supplements could enhance productivity or at least avoid body weight loss during critical feed shortage periods of the year. Supplementary forage legumes greatly improve the voluntary feed intake and digestibility of low quality roughages. Forage legume supplements improve N metabolism and utilization and increase energy availability to the animal leading to improved production and reproductive performance of animals. However, the type and level of supplementation depends on the availability and relative cost of the supplements and the intended purpose or the desired level of animal production.


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**Abstract**: A survey was conducted in Kochore (Fiseha Genet) woreda (district) of Gedeo zone, southern Ethiopia to identify the production situation and some productivity and physical characteristics of sheep and goats traditionally managed by small farmers in the area. The adult male: female ratio is 1: 4.2 and 1: 3.7 for sheep and goats, respectively. The sheep have thin to semi-fat and long tail. The age at first parturition (21 months for sheep and 19.5 months for goats) and the parturition intervals (11.7 and 10.8 months for sheep and goats, respectively) are comparable to reported values in the literature for other African sheep and goats under traditional management. Disease and parasite infestation and inadequate feed supply during the dry season are major constraints affecting small ruminant productivity in the area. Dependence on breeding males borrowed from neighbours (50% of the respondents) could also hamper the reproductive performance of the flocks. Thus, extension work aimed at improving feed supply during dry season, control of disease and parasite and selection and proportionate distribution of breeding males are viable options for improving small ruminant productivity in the area.

**Key words**: Sheep, Goats, Flock structure, Productivity, Physical characters

*Adugna Tolera¹, Alemayehu Kidane¹, and Woldegebriel Tesfamariam¹, 2006. The effect of nitrogen fertilization and cutting age on dry matter yield and protein content of Rhodes grass at Awassa, southern Ethiopia, Tropical Science, 46(2): 87-91
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Abstract: The crude protein content of Rhodes grass was highest when 69 kg N/ha was applied. The dry matter content of the fresh forage increased with increasing age of regrowth. The crude protein yield did not vary between the different ages of regrowth as the increasing yield offset the decreasing protein content. Overall, the application of 69 kg N/ha appears to be the optimum level of nitrogen fertilizer in terms of dry matter yield and nutritive value of the grass.

Key words: Rhodes grass, nitrogen fertilization, cutting age, yield, protein content


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Abstract: Livestock production situation and feed resources availability in pastoral and agro-pastoral production system of southern Ethiopia were assessed based on field visits and interview of selected households as well as group discussions with the pastoralists. A semi-structured questionnaire was used for interviewing 60 randomly selected pastoralists. Informal discussions were also held with a group of pastoralists in each of the areas assessed as well as with the development agents working in the localities. The collected data were analyzed using descriptive statistics. The survey showed that numerically cattle are the most important species followed by goats, camels and sheep. The main feed resources of the area are natural pastures (herbaceous vegetation composed mainly of grasses and forbs and browses such as shrubs, tree leaves and pods), which show marked seasonal variation in availability and quality based on variability of rainfall distribution. Productivity of animals in terms of milk production, growth rate and reproductive performance is generally low. Crop production is increasingly practiced as a means of economic diversification although crop failure is a common feature because of unreliable rainfall and frequent drought. Thus, livestock production remains to be the main means of livelihood. Hence, more emphasis should be given to improving livestock productivity and proper management of the rangelands. Efforts to reverse or at least halt the advancement of bush encroachment should be encouraged and strengthened.

Keywords: Borana, bush encroachment, cropping, feed resources, rangelands


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Abstract: This study was carried out to assess the effects of variety, year, location and level of fertilizer application on chemical composition and in sacco dry matter (DM) degradability of durum wheat straw as well as to understand the relationship between straw quality and agronomic traits of the crop and to assess the possibilities of selecting wheat varieties that combine high grain yield with desirable straw quality. Two local (Arendeto and Tikur sinde) and two improved (Boohai and Gerardo) varieties of durum wheat (Triticum turgidum Desf.) were used in the experiment. The four varieties were grown at two locations (Akaki and Ejere) in the years 2001/2002 and 2002/2003 in 5 x 5 m plots in three replications. Diammonium phosphate and urea fertilizers were applied at four levels (0/0, 32/23, 41/23 and 64/46 kg/ha of nitrogen/phosphorus). Straw quality was assessed based on chemical composition and in sacco DM degradability. Correlation of straw quality with grain and straw yield and with other agronomic characteristics of the crop was determined. The potential utility index (a measure that integrates grain and digestible straw yield) was used for ranking of the varieties. The local varieties had higher crude protein (CP) and lower neutral detergent fibre contents and higher digestibility than the improved varieties. The cropping year and location had significant effect on CP content and degradability of the straw, which could be due to climatic variation. However, the fertilizer level did not have any significant effect on straw quality except
that the CP content of the straw tended to increase with increasing level of fertilizer application. Based on the potential utility index the varieties ranked, in a decreasing order, as Tikur sinde > Arendeto > Gerardo > Boohai and the ranking was consistent across years and locations. Except the CP content, straw quality was not negatively correlated with grain and straw yield. This indicates that there is a possibility of selecting varieties of wheat that combine high grain and straw yield with desirable straw quality.

**Key words:** Crop residue, variety, chemical composition, dry matter degradability, potential utility index


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**Abstract:** The in sacco dry matter (DM) degradability of diets based on maize stover harvested at three stages of maturity and supplemented with graded levels of desmodium (Desmodium intortum cv. Greenleaf) hay were estimated from degradability of the individual feeds and their corresponding DM intake. The estimated DM degradability of the diets was used for prediction of DM intake (DMI), digestible DM intake (DDMI), DM digestibility (DMD) and growth rate of sheep feeding on the diets. The desmodium hay had significantly higher (P<0.05) DM disappearance than the maize stovers after 4, 8, 16, 24 and 48 h of incubation, as well as higher washing loss (A), degradation rate (c value) and effective DM degradability (ED) than the maize stovers. The washing loss was lowest in maize stover harvested at stage III and, as a consequence, the washing loss of the diets showed a significant decrease (P<0.05) with increasing stage of maturity of the stovers. The DM disappearance after 48 h incubation, washing loss and degradation rate showed a significant increase whereas the insoluble, but potentially degradable, fraction (B) showed a significant decrease (P<0.05) with increasing level of supplementation. The DM disappearance after 24 and 48 h of incubation, washing loss, ED and degradation rate showed strong positive correlation whereas the insoluble, but potentially degradable, fraction showed a negative correlation with DMI, DMD, DDMI and growth rate. On the other hand, the DM disappearance after 96 h of incubation, potential degradability and the lag phase showed very low correlation with these parameters. In general, the washing loss, ED and the DM disappearance after 24 and 48 h of incubation were found to be simple and reliable predictors of DMI, DDMI, DMD and growth rate. However, the use of the A, B and c values simultaneously in a multiple regression gave a more precise prediction of feed intake, digestibility and growth rate.

**Key words:** Maize stover, Desmodium intortum, In sacco degradability, Feed intake, Digestibility

*Adugna Tolera*1,2 and Frik Sundstûl1, 2000. Supplementation of graded levels of Desmodium intortum hay to sheep feeding on maize stover harvested at three stages of maturity: Feed intake, digestibility and body weight change, *Animal Feed Science and Technology* 85:239-257

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**Abstract:** Feed intake, digestibility and body weight change of lambs fed basal diets of maize stover harvested at three stages of maturity and supplemented with graded levels (0, 150, 300 and 450 g per head per day) of desmodium (Desmodium intortum cv. Greenleaf) hay were studied. The maize stovers were harvested at 30, 22 and 12% grain moisture content which were designated as stages I, II and III, respectively. The crude protein (CP) content of the stovers showed a decreasing trend whereas the %bre contents showed an increase from stages I to III. The desmodium hay had higher CP, phenolic compounds, calcium, sulphur and manganese contents and lower %bre (neutral and acid detergent %bres, cellulose and hemicellulose) contents than the stovers. Maize stover, total dry matter (DM) and organic matter (OM) intake showed a decreasing trend (p> 0.05) with increasing stage of maturity of the stover. The CP intake was signi®cantly higher (p< 0.05) in sheep fed maize stover harvested at stage I than at stages II and III.
Total DM, OM and CP intake increased whereas maize stover DM intake showed a significant decrease (p<0.05) with increasing level of supplementation. Desmodium hay constituted about 28, 47 and 66% of the total DM intake and, on average, there was a substitution of about 12, 21 and 37% of the stover by the desmodium hay at 150, 300 and 450 g of supplementation, respectively. Dry matter, OM and neutral detergent fibre (NDF) digestibilities showed a decreasing trend (p>0.05) with increasing stage of maturity. Crude protein digestibility and the intakes of digestible OM and metabolizable energy (ME) were significantly higher (p<0.05) in sheep feeding on maize stover harvested at stage I than stage III and showed a general declining trend with increasing stage of maturity of the stover. Supplementation resulted in improved digestibility of the diet. There was a significant increase (p<0.05) in CP digestibility, digestible OM intake, digestible organic matter in the DM (DOMD), ME concentration of the diet and ME intake with increasing level of supplementation. The body weight gain showed a significant increase (p<0.05) with increasing level of supplementation whereas all sheep without supplement lost body weight. The weight loss increased with increasing stage of maturity of the stover. Considering DM intake and digestibility, 300 g of desmodium hay appears to be an optimum level of supplementation, under similar conditions to the current study.

**Key words:** Maize stover, Stage of maturity, Desmodium intortum, Feed intake, Substitution rate, Digestibility, Body weight gain

*Adugna Tolera*¹,² and Frik Sundstøl³, 2000. Supplementation of graded levels of *Desmodium intortum* hay to sheep feeding on maize stover harvested at three stages of maturity 2. Rumen fermentation and nitrogen metabolism, Animal Feed Science and Technology, 87(3-4): 215-229

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**Abstract:** The utilisation of cereal crop residues as animal feed is limited by deficiencies of protein, fermentable energy and other nutrients. In this study, rumen fermentation and nitrogen metabolism of lambs fed basal diets of maize stover harvested at three stages of maturity and supplemented with graded levels (0, 150, 300 and 450 g per head per day) of desmodium (*Desmodium intortum* cv Greenleaf) hay were investigated. The maize stovers were harvested at 30, 22 and 12% grain moisture content which were designated as stages I, II and III, respectively. Rumen ammonia and volatile fatty acids (VFA), nitrogen (N) balance and microbial N supply, based on urinary excretion of purine derivatives, were determined. The concentration of ammonia-N in rumen fluid was significantly lower (P<0.05) in sheep fed maize stover harvested at stage III than at stages I and II and increased significantly (P<0.001) with increasing level of supplementation. The total VFA concentration and the molar proportions of acetate and butyrate in rumen fluid were not significantly influenced (P>0.05) by the stage of maturity of the stover. The total VFA content increased with increasing level of supplementation and varied from 64.1 to 113.6 mmol/l of rumen fluid. The N intake, N absorbed and N retained decreased with increasing stage of maturity of the stover and showed a significant linear increase (P<0.05) with increasing level of supplementation. However, use of maize stover as a sole diet resulted in negative N balance at all stages of maturity due to the low N content of the stover. Microbial N supply was not affected by stage of maturity of the stover while microbial efficiency (g/kg digestible organic matter fermented in the rumen) was significantly lower (P<0.05) in sheep fed maize stover harvested at stage III than at stages I and II. The microbial N supply increased with increasing level of supplementation, presumably due to improved degradation of the diet and increased supply of N, fermentable carbohydrates, sulphur and probably other essential nutrients.

**Key words:** Maize stover, *Desmodium intortum*, Rumen ammonia, Volatile fatty acids, Nitrogen retention, Purine derivatives

*Adugna Tolera*¹,² and Frik Sundstøl³, 1999. Morphological fractions of maize stover harvested at different stages of grain maturity and nutritive value of different fractions of the stover, Animal Feed Science and Technology, 81: 1-16

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Abstract: The proportion of different morphological fractions of maize stover was assessed at three stages of grain maturity and nutritive value of the morphological fractions was evaluated based on chemical composition, in sacco dry matter (DM) degradability and in vitro gas production. Stem proportion of the stover increased by 20%, whereas the proportions of tassel and leaf blades decreased by 41.5 and 44%, respectively, as grain moisture content dropped from about 30–10%. The crude protein (CP) content was highest in leaf blade and tassel. Leaf blade had the lowest neutral detergent fibre (NDF), acid detergent fibre (ADF) and cellulose contents and the highest ash, ADF-ash and total proanthocyanidins (TPA) contents. On the other hand, CP, ash, ADF-ash and TPA contents were lowest and the NDF content was highest in husk. Stem had the highest ADF, lignin and cellulose contents. The overall in sacco DM degradability tended to be higher in leaf blades and lower in leaf sheaths than in the other morphological fractions. The washing loss was highest \( p < 0.05 \) in stem and lowest in leaf blade and husk. On the other hand, leaf blade had significantly higher \( p < 0.05 \) degradation of the water insoluble fraction than leaf sheath, stem and whole stover. The lag time was highest \( p < 0.05 \) in stem and lowest in leaf blades. The morphological fractions differed in the volume of gas produced in the following order: husk > whole stover > stem > leaf sheath > leaf blade > tassel. Stem and whole stover showed rapid gas production in the early stage of fermentation, although the gas production rate of stem started to decline earlier than that of the other morphological fractions. Gas production due to fermentation of insoluble feed components, which mostly occurred between 6 and 24 h of incubation, was highest in husk. In vitro gas production and in sacco DM degradability could not rank the morphological fractions in a similar order which could be due to the effect of protein fermentation on gas production. Gas production showed an inverse relationship with CP, ash, ADF-ash and TPA contents of the morphological fractions.

Key words: Maize stover, Morphological fractions, Chemical composition, DM degradability, Gas production

*Adugna Tolera\(^1\), Frik Sundstøl\(^2\) and Abdullah N Said\(^3\), 1998, The effect of stage of maturity on yield and quality of maize grain and stover, Animal Feed Science Technology, 75: 157-168

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Abstract: Stage of maturity at the time of harvest is considered as one of the factors influencing the nutritive value of crop residues. Thus this study was carried out to assess the effect of harvesting maize at different stages of grain maturity on yield and quality of maize grain and stover. The maize crop was harvested at grain moisture content of 28–30, 20–23 and 10–12%, which were designated as Stages I, II and III, respectively. Grain yield, standardised to 12.5% moisture content, showed an increasing trend, whereas cob, stover, total crop residue and total biomass dry matter (DM) yield showed a decreasing trend with increasing stage of maturity \( p > 0.05 \). The declining trend in stover yield with increased stage of maturity was due mainly to leaf loss. There was a significant decrease \( p < 0.05 \) in crop residue–grain ratio and leaf–stem ratio and a significant increase in the harvest index and hectarolitre weight of the grain as the grain moisture content decreased from about 30 to 10%. Maize stover harvested at Stage I had significantly higher \( p < 0.05 \) ash content than those harvested at Stages II and III. The crude protein (CP) content was significantly lower, whereas the neutral detergent fibre and cellulose contents were higher \( p < 0.05 \) in Stage III than in Stages I and II. There was a decreasing trend in in sacco DM degradability with increasing stage of maturity. The washing loss, potential degradability and effective DM degradability at 0.03 h\(^{-1}\) rumen outflow rate were higher \( p < 0.05 \) in Stage I than in Stages II and III. The volume of gas produced after 3, 6, 12, 24, 48 and 72 h of incubation was higher \( p < 0.05 \) in Stage I than in Stages II and III. The \( a \) value (the intercept of the gas production curve) and the gas production potential \( (a+b) \) were higher \( p < 0.05 \) in Stage I than in Stage III. Reduction in the nutritive value of stover with increasing stage of maturity was characterised by reduction in CP contents and increasing concentration of fibrous constituents. These were reflections of changes in the morphological composition of stover and losses of nutrients within the morphological fractions with increasing stage of maturity.

Key words: Maize, Maize stover, Stage of maturity, Nutritive value
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*Adugna Tolera*¹, Trygve Berg² and Frik Sundstøl², 1998. The effect of variety on maize grain and crop residue yield and nutritive value of the stover, *Animal Feed Science and Technology*, 79: 165-177

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**Abstract:** Eight varieties of maize, namely Awassa 511 (A511), Birkata, Composite of best families (CBF), Dendane, Drought tolerant population (DTP1), Guto, Katumani and Keroshet planted in 1995 cropping season were compared for grain and crop residue yield and nutritive value of the stover. Significant differences ($p < 0.05$) were observed in grain and crop residue yields of the varieties. Grain yield was highest (6.99 t ha$^{-1}$) in DTP1 and lowest (2.21 t ha$^{-1}$) in Keroshet. Stover and total crop residue yields were significantly higher ($p < 0.05$) in A511 than in CBF and Dendane. The stem was the largest portion in the stover varying from 31% in Dendane to 50% in A511. The stover of Birkata showed a high crude protein (CP) and low ash and fibre contents compared to the other varieties. The CP content varied from 28 g kg DM$^{-1}$ (Guto) to 61 g kg DM$^{-1}$ (Birkata). Crop residue yield and quality parameters, except CP content of the stover, were not negatively correlated with grain yield. The potential utility index varied from 61% (Keroshet) to 74% (CBF). The varieties with higher potential utility indices, except Guto, also had relatively higher solubility, 48 h DM degradability and effective degradability compared to the other varieties. The overall results showed evidence of varietal differences in grain and stover yield and stover quality and indicated the possibility of selecting for maize varieties that combine high grain yield and desirable stover characteristics.

**Key words:** Maize, Grain, Crop residue, Stover, Nutritive value, Potential utility index


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**Abstract:** Browse plants play an important role in providing fodder for ruminants in most parts of the World. However, the presence of tannins and other phenolic compounds in a large number of these feed resources limits their utilization as animal feed. This paper presents the nutritive value of some browse species based on their chemical composition (nitrogen, polyphenolics and neutral detergent fibre (NDF) content), dry matter (DM) degradability in sacco and gas production in vitro including the effect of the phenolic binding compound, polyethylene glycol-4000 (PEG 4000), on in vitro gas production. The browse species evaluated were *Calluna vulgaris* (heather), *Sarothamnus scoparius* (broom), *Ulex europaeus* (gorse) and *Chamaecytisus palmensis* (tagasaste). The crude protein (CP) content was highest ($P < 0.05$) in broom (189 g kg$^{-1}$ DM) followed by tagasaste (175 g kg$^{-1}$ DM) and gorse pre-flower (168 g kg$^{-1}$ DM) and the lowest was in heather (98 g kg$^{-1}$). Heather had the highest ($P < 0.05$) concentration of the phenolic compounds compared with all the other species. Gorse in-flower contained a higher concentration ($P < 0.05$) of total extractable phenols (TEPH), total extractable tannins (TETa) and NDF and a lower content of CP than gorse pre-flower which is a reflection of their stage of maturity. As a result, gorse pre-flower had a higher in sacco degradability and in vitro gas production than gorse in-flower. Heather had the lowest degradability values. The ranking order of the browse plants in gas production was gorse pre-flower > tagasaste > broom > gorse in-flower > heather which was similar to their in sacco degradability values. As a result, gorse pre-flower had a higher in sacco degradability and in vitro gas production than gorse in-flower. Heather had the lowest degradability values. The ranking order of the browse plants in gas production was gorse pre-flower > tagasaste > broom > gorse in-flower > heather which was similar to their in sacco degradability values. Increasing the amount of substrate incubated slightly depressed the amount of gas produced by the browse plants. The response to PEG treatment increased with increased concentration of phenolic compounds in the browse plants. Thus, in heather, gas production increased by 51% at 12 h of incubation as a result of PEG treatment while the response was zero in the species with a low content of phenolic compounds. The results show that the phenolic compounds depress in vitro gas production and that PEG treatment has a potential for improving gas production and fermentation of feedstuffs high in phenolics due to the binding of the phenolic compounds to the PEG.

**Key words:** Browse, Phenolics, PEG, DM degradability in sacco, Gas production in vitro

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Abstract: The potential of Desmodium intortum, Macrotyloma axillare and Stylosanthes guianensis hays for improving the digestibility of a standard diet of maize stover was assessed using in sacco, in vitro and in vivo methods. In sacco degradability results showed that S. guianensis hay had the highest potential and effective DM degradability. S. guianensis hay also had higher (P<less than>0.05) in vitro DM digestibility than maize stover, D. intortum and M. axillare. In vitro DM digestibility was negatively correlated (r = <minus>0.97) with ADF content of the feeds. The in vivo data showed no significant differences among different species of legume hay supplements and levels of supplementation in DM and OM digestibility. The NDF, ADF and CP digestibility were higher (P<less than>0.05) in S. guianensis hay supplemented groups than groups supplemented with the other forage legume hays. This was associated with lower levels of ADF and lignin and higher CP content in S. guianensis hay. It is concluded that S. guianensis was better than the other 2 forage legumes in improving nutrient (CP, NDF, ADF and estimated in vitro DM) digestibility of maize stover-based diets. This may be due to low fibre content, increased nitrogen availability and improved rumen microbial activity.

Key words: Sheep, Animal Feeding, Maize Stover, Feed Crops, Diet, In Vitro Digestibility, Legumes, Desmodium Intortum, Macrotyloma Axillare, Stylosanthes Guianensis, Hay, Ruminants


Abstract: Katikalla atella is a by-product of traditional alcoholic beverage produced by distillation process which is used as a livestock feed by smallholder farmers. The objective of this experiment was to evaluate the effects of feeding different levels of katikalla atella as a supplement to wheat straw in sheep feeding. Twenty-four yearling Adil rams with an average initial body weight of 16.8 ± 1.4 kg were assigned to the following treatments in a completely randomized design: ad libitum wheat straw + 85.5 g atella (T1), 171 g atella (T2), 256.5 g atella (T3) and 342 g atella (T4) on dry matter (DM) basis. The highest (P< 0.05) DM and organic matter (OM) intake was for T4 and T3, while the lowest (P< 0.05) was for T1. The crude protein (CP) intake increased (P< 0.05) with increasing levels of atella. Sheep in T1 consumed the highest acid detergent fiber (ADF) whereas the lowest was for T4. The neutral detergent fiber (NDF) intake for T1, T2 and T3 was higher (P< 0.05) than that of T4. Sheep in T3 and T4 gained more weight (P< 0.05) than those in T1 where weight loss was observed. There was no significant difference in weight gain among T2, T3 and T4. The digestibility of DM for T4 was higher (P< 0.05) than that of T1, where T2 and T3 were intermediate. The CP digestibility for T4 was higher than that of T3 and T1. There were no significant differences in the digestibility of OM, NDF and ADF among treatments. Sheep in T3 and T4 lost the highest (P< 0.05) nitrogen (N) in faeces and the lowest loss was for T1. The N balances were in the following order: T4>T3=T2>T1. It can be concluded that it has no beneficial effect for feeding atella above 256 g per day on DM basis.

Key words: Feed intake, atella, Ethiopia, wheat straw, nitrogen balance, sheep


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Abstract: Effects of supplementing sheep consuming wheat straw with local agro-industrial by-products on feed intake, growth, digestibility and nitrogen utilization were determined. Thirty 1-year-old local wethers, with a mean (±SD) live weight of 19.8 (±1.06) kg, were assigned to five treatments: wheat straw + atella (T1), wheat straw + atella + poultry litter (T2), wheat straw + atella + coffee pulp (T3), wheat straw + atella + coffee pulp + poultry litter (T4), hay + concentrate (T5). A 7-day digestibility experiment and a 112-day growth trial were conducted. Total dry matter (DM) and organic matter (OM) intake as well as body weight gain was similar for all treatments. The highest (P < 0.05) nitrogen (N) intake was in sheep fed T1 and T4 diets, while the lowest was in those fed T2 and T5 diets. Sheep fed T1 and T2 diets had greater (P< 0.05) DM and OM digestibility than those fed T4 and T5 diets. The highest (P< 0.05) digestibility of N was for the T2, T4, and T5 diets, while the lowest was for the T1 diet. The highest N retention was in T4 diet, whereas the lowest was in T3 diet. In conclusion, in urban and peri-urban areas where atella, poultry litter, or coffee pulp are available, smallholder farmers could feed the mixtures as a supplement to straw with a good performance without using concentrate feeds.

Key words: Coffee pulp, Growth, Katikala atella, Local by-products, Sheep

Ajebu Nurfeta, 2010. Digestibility and nitrogen utilization in sheep fed enset (Ensete ventricosum) pseudostem or corm and graded levels of Desmodium intortum hay to wheat straw-based diets, Journal of Animal Physiology and Animal Nutrition, 94(6): 773-779

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Summary: The aim of this study was to investigate the effects of different levels of Desmodium intortum (Desmodium) hay supplementation in sheep fed fixed amounts of enset pseudostem or corm and a basal diet of wheat straw on intake, digestibility and nitrogen utilization. Eighteen male sheep with a mean (± SD) live weight of 20.5 ± 1.45 kg were assigned to six treatments in a completely randomized design and fed either 108 g dry matter (DM) enset pseudostem or 165 g DM enset corm each with three levels (100, 200 and 300 g) of hay supplementation. For the pseudostem diets, there was no significant difference in total DM intake. Total crude protein (CP) intake and N retention increased with increasing levels of hay in both pseudostem and corm diets. The apparent digestibility of DM, OM, CP, acid detergent fibre and neutral detergent fibre (NDF) and microbial nitrogen supply (MN) at 100 g was lower than other levels of supplementation. For the corm diets, total DM and OM intake and MN supply increased with increasing levels of hay. The digestibility decreased (p< 0.001) with increasing levels of supplementation. The results suggest that at least 300 g (395 g/kg dietary DM) of Desmodium hay is required in pseudostem diets, whereas 200 g (337 g/kg dietary DM) may be sufficient in corm diets for efficient nutrient utilization.

Key words: Sheep, Ensete ventricosum, enset parts, supplementation, nitrogen supply

*Ajebu Nurfeta1, Abebe Berecha2 and Aberra Melesse1,3, 2013. The Effects of Tagasaste (Chymancytisus palmensis) Leaf Meal Supplementation on Feed Intake, Growth Performance and Carcass Characteristics of Rhode Island Red Chicks, In: Conference Proceeding of Agricultural development within the rural-urban continuum, Tropentag, Stuttgart-Hohenheim, September 17-19, 2013

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Abstract: The effects of feeding varying levels of tagasaste leaf meal on performance and carcass characteristics of Rhode Island Red chicks were evaluated. Tagasaste was introduced to Ethiopia in 1984 by Minister of Agriculture from Western Australia. For this experiment, fresh tagasaste leaves were collected from Holetta Agricultural Research Institute of Ethiopia and sun-dried. One hundred sixty dual-purpose Rhode Island Red chicks with an average initial weight of 65.5 ± 8.9 g were allocated to 16 pens, with ten chicks each in a completely randomized design. Four isonitrogenous and isocaloric diets were formulated to contain tagasaste leaf meal at the rate of 0% (T1), 5% (T2), 10% (T3) and 15% (T4) of the total diet dry
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matter (DM). At the beginning of the trial, eight chicks were selected and slaughtered for chemical analyses to determine nutrient retention. At the end of the trial, a male and a female from each replicate were slaughtered for chemical analysis and carcass trait measurement. The average daily DM intake for T4 (48.9 g ±1.03) was higher than that of T1 (45.9 g ± 1.04). The highest (p< 0.05) ash (11.4 g ±0.15, calcium (1.03 g ± 0.01) and crude fiber (4.57 g ± 0.09) intake was observed in chicks fed T4 diets. The average crude protein intake was higher (p< 0.05) in supplemented chicks compared to the non-supplemented one (8.13 g vs. 7.55 g). The metabolisable energy intake was similar (p > 0.05) among treatment groups. The protein, energy and calcium retention decreased (p< 0.05) as the level of tagasaste leaf meal increased in the diet. The average daily gain was highest (6.22 g ± 0.23; p< 0.05) for T1 diet but it was similar (5.3 ± 0.26; > 0.05) among other treatment groups. The slaughter revealed that drumstick, thigh, back, breast and carcass weights were highest (p< 0.05) for T1 diet and lowest for other treatments. The dressing percentage was similar (p> 0.05) across treatment diets ranging from 58.0 g ± 1.03 in T2 to 60.5 g ± 1.05 in T3. It is concluded that tagasaste leaf meal could be considered as a good source of both protein and energy for smallholder farmers where other conventional supplements are not available.

Key words: Carcass characteristics, growth performance, Rhode Island Red chicks, Tagasaste leaf meal


Summary: Feed intake, in vivo nutrient digestibility and nitrogen utilization were evaluated in male sheep fed different fractions (leaf, pseudostem, corm, whole plant) of enset, untreated or 2% urea- and 3% calcium oxide- (CaO or lime) treated wheat straw and Desmodium intortum hay as sole diets. All feeds, except D. intortum hay and enset leaf had low crude protein (CP) content. Non-fiber carbohydrate contents were higher in enset fractions, especially in pseudostem and corm relative to other feeds. Enset leaf and pseudostem had high calcium, phosphorus and manganese contents. Corm, whole enset and D. intortum hay were rich sources of zinc. Daily dry matter and CP intakes were higher (p< 0.05) in sheep fed D. intortum hay (830 and 133 g, respectively) than those fed pseudostem (92 and 7.8 g, respectively). Organic matter digestibilities were highest for corm (0.780) and whole enset (0.776) and lowest for D. intortum hay (0.534) and untreated wheat straw (0.522). The CP digestibility ranged from 0.636 in D. intortum hay to 0.408 in corm. Nitrogen (N) balance was highest (p< 0.05) in D. intortum hay (10.4 g/day) and lowest in corm (-1.3 g/day). Enset leaf could be a useful protein supplement whereas the pseudostem and corm could be good sources of energy.

Key words: Ethiopia, enset fractions, wheat straw, urea/lime treatment, digestibility, nitrogen balance

*Ajebu Nurfeta1,2, Adugna Tolera2, Lars O. Eik1 and Frik Sundstol3, 2009. Effect of enset (Ensete ventricosum) leaf supplementation on feed intake, digestibility, nitrogen utilization and body weight gain of sheep fed untreated or urea and calcium oxide-treated wheat straw, Livestock Science, 122(2-3): 134-142

Abstract: The study was carried out to evaluate the effect of supplementing leaves of enset (Ensete ventricosum) to straw-based diets on the performance of sheep. In a growth experiment, which lasted for 76 days, 36 male sheep (average body weight of 17.3±0.58 kg) were allotted to six treatments. A digestibility trial was conducted using three of the six sheep from each treatment. The treatments were untreated or 2%
urea- and 3% calcium oxide-treated wheat straw as a basal diet supplemented with three levels of chopped fresh enset leaf: low (215 g), medium (417 g) and high (594 g dry matter [DM] per day). The mean total DM intake tended to be higher (P<0.1) at medium and high levels of supplementation than at the low level. The intake of total DM and nitrogen (N) was higher in treated than untreated straw. There was no significant difference in organic matter (OM) intake among treatments. Sheep fed medium and high levels of enset leaf supplements had similar weight gain but higher than those supplemented at low level. The digestibility of DM was not significantly different among treatments whereas the digestibility of OM tended to be higher at medium than other levels of supplementation. The digestibility of N was lower (P<0.001) for treated than untreated straw whereas the digestibility of neutral detergent fibre was higher (P<0.001) in treated straw. The highest mean N retention was at medium level of supplementation. There were no significant differences in total purine derivatives excretion, absorbed microbial purines and microbial N supply among treatments. It could be concluded that there is no major beneficial effect beyond medium level of enset leaf supplementation in both treated and untreated straw. For efficient utilization of enset leaf, sources of fermentable energy are necessary.

Keywords: Sheep; Enset leaf; Urea; Calcium oxide; Wheat straw; Purine derivatives

*Ajebu Nurfeta12, Adugna Tolera2, Lars O. Eik1 and Frik Sundstøl3, 2008. The supplementary value of different parts of enset (Ensete ventricosum) to sheep fed wheat straw and Desmodium intortum hay, Livestock Science, 119(1-3): 22-30

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Abstract: A study which included growth and digestibility experiments was conducted to evaluate the feeding value of a) enset pseudostem, b) enset corm or c) enset mixture (containing equal amounts of pseudostem, corm and enset leaf on a DM basis) as a supplement to a basal diet of wheat straw fed ad libitum and restricted amounts of Desmodium intortum (Desmodium) hay to sheep. During the 71-day growth experiment, 18 one-year-old male sheep of indigenous breed with mean body weight (BW) of 20.2 (±0.43) kg were randomly assigned to the three treatments. In the digestibility experiment, three male sheep with mean BW of 19.5 (±1.06) kg were assigned to each treatment. Sheep supplemented with enset mixture consumed more (P<0.001) wheat straw DM (335 g/day) than those supplemented with pseudostem (295 g/day). No differences were found in total dry matter (DM) and organic matter (OM) intake between diets supplemented with pseudostem, corm and enset leaf mixture. Total nitrogen (N) intake (g/day) was higher (P=0.0073) in sheep fed the diet with enset mixture (12.2) followed by corm (11.3) and pseudostem (10.7). The apparent digestibility of DM was higher (P<0.001) in pseudostem (0.53) followed by corm (0.46) and enset mixture (0.41) supplemented sheep. Organic matter, neutral detergent fiber and N digestibility were similar among treatments. The amount of N lost in urine and faeces and the N-retention was similar among treatments. There were no differences in gain/day in sheep fed diets with pseudostem (29.3 g), corm (27.0 g) and enset mixture (36.5 g). It is concluded that supplementation of a wheat straw/Desmodium diet with enset fractions could be used equally at least to maintain body weight during the dry season.

Key words: Enset fractions; Sheep; Dry season feeding; Nitrogen-retention; Digestibility


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Abstract: On-farm study was conducted to evaluate the effects of enset (Ensete ventricosum) leaf supplementation on doe’s milk yield and composition and growth rates of their kids. Forty-eight pregnant does were randomly divided into four feeding groups of twelve animals per treatment in a completely
randomized design. Each treatment was further divided into three replications of four animals per replications. The treatments were: grazing only (T1), 74 g + grazing (T2), 148 g + grazing (T3) and 220 g + grazing (T4) on dry matter (DM) basis of enset leaf supplementation. Kids were allowed to suckle their dams during daytime up to 90 days and milk was measured every morning after overnight separation of kids and dams. Increasing the levels of enset leaf increased (p< 0.05) enset leaf DM intake. The crude protein intake at a higher level (T4) was higher (p<0.05) than that of T3 and T2. Milk yield was higher (p< 0.05) in the supplemented does than non-supplemented ones. The average milk yield (liter/day) was observed to be 0.37, 0.59, 0.50, and 0.45 for T1, T2, T3 and T4, respectively. Growth rates of kids from the supplemented does were higher (p< 0.05) than the non-supplemented ones. The highest (p< 0.05) fat content was observed for T2 and the lowest for the control (T1) goats. Protein content of milk increased (P<0.05) with increasing levels of supplementation. Supplementary, feeding improved milk yield as well as protein and fat contents thereby enhancing the growth performance of the kids. It can, therefore, be inferred that supplementation of does with enset leaves can assist in overall improvement in family income and also nutrition of the small holder farmers in general in addition to improving the growth performance of kids.

Key words: Ensete ventricosum, intake, milk yield, weight gain, goats

*Ajebu Nurfeta¹, Lars O. Eik¹, Adugna Tolera² and Frik Sundstøl³, 2008. Chemical composition and in sacco dry matter Degradability of different morphological fractions of 10 enset (Ensete ventricosum) varieties, Animal Feed Science and Technology, 146(1-2): 55-73

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Abstract: Enset (Ensete ventricosum), also known as ‘false banana’, is a perennial herbaceous monocarpic plant, which grows in the southern and south-western parts of Ethiopia for human consumption and animal feed. The objective of this study was to investigate the chemical composition and dry matter (DM) degradability of four fractions (leaf lamina, leaf midrib, pseudostem and corm) of 10 selected enset varieties (Addo, Astara, Birra, Chacho, Derassa Addo, Genticha, Gossalo, Gulumo, Kiticha and Midasho). Samples were taken from 5- to 6-year-old enset during the main rainy season. For degradability studies, three rumen fistulated male sheep were used. The dry matter content (g/kg) ranged from 106 to 172 for leaf lamina, from 42 to 100 for leaf midrib, from 55 to 146 for pseudostem and from 173 to 293 for corm. The overall DM was lowest in leaf midrib (62 g/kg DM) and highest in corm (227 g/kg DM). The neutral detergent fiber (NDF) content (g/kg DM) varied from 659 to 753 in leaf lamina, from 585 to 694 in leaf midrib, from 551 to 825 in pseudostem and from 339 to 893 in corm. Acid detergent fiber (ADF) content (g/kg DM) varied from 313 to 387 in leaf lamina, from 377 to 491 in leaf midrib, from 75 to 249 in pseudostem and from 52 to 84 in corm. The crude protein (CP) content (g/kg DM) of the leaf lamina was lowest in Gulumo (164) and highest in Genticha (245). CP content in the leaf midrib varied from 39 to 60. In pseudostem, CP content ranged from 25 to 50. CP content in corm varied from 18 to 100. The metabolizable energy (ME) content was lowest in leaf lamina (5.4 MJ/kg DM) and highest in corm (13.1 MJ/kg DM). DM degradability of the different fractions, at 96 h of incubation, differed in the following order: corm (0.942) > pseudostem (0.889) > leaf midrib (0.668) > leaf lamina (0.450). Washing loss ranged from 0.180 to 0.299 in leaf lamina, from 0.137 to 0.365 in leaf midrib, from 0.327 to 0.543 in pseudostem and from 0.464 to 0.645 in corm. Potential degradability (A + B) ranged from 0.423 to 0.797 in leaf lamina, from 0.602 to 0.817 in leaf midrib, from 0.796 to 0.988 in pseudostem and from 0.893 to 0.981 in corm. It is concluded that enset is a valuable dry-season feed, especially due to high CP contents of leaf lamina and high DM degradability of pseudostem and corm. The differences in chemical composition and degradability observed between fractions from different varieties of enset underline the importance of including feeding traits in future breeding programs for enset.

Key words: Ensete ventricosum, Morphological fractions, Chemical composition, Degradability
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*Ajebu Nurfeta¹, Lars O. Eik¹, Adugna Tolera² and Frik Sundstol³, 2008. Yield and mineral content of ten enset (Ensete ventricosum) varieties, Tropical Animal Health and Production, 40(4): 299-309

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Abstract: A study was conducted to evaluate the macro and trace mineral contents of ten enset varieties collected from Sidama zone of southern Ethiopia. Samples of leaf lamina, leaf midrib, pseudostem and corm were taken from ten enset varieties at the age of 5 to 6 years during the main rainy season. The dry weight of each variety and fraction were also determined. Mineral contents in fractions of different enset varieties were analysed and compared with nutrient requirements of ruminants. The contribution of different enset fractions to the total dry weight was variable (P<0.05), the highest being from pseudostem and the lowest from leaf lamina. There were varietal differences (P<0.05) in macro and trace mineral content in different fractions except phosphorus (P) content of leaf lamina. Most enset fractions were rich sources of major minerals such as P, potassium (K), calcium (Ca) (except corm) and magnesium (Mg). Sodium (Na) content was very low. Most fractions were rich in iron (Fe) and manganese (Mn), but deficient in copper (Cu), except leaf lamina. Zinc (Zn) content was high in corm, but low in other fractions. This account of the macro and trace mineral content of different enset varieties and fractions could help in strategic supplementation intended to alleviate mineral deficiencies.

Keywords: Ensete ventricosum, enset varieties, enset fractions, mineral content, Ethiopia

*Ajebu Nurfeta¹, Meseret Tsegaye¹ and Aster Abebe¹, 2013. Effects of substituting maize with kocho on intake, digestibility, nitrogen utilization and body weight gain in sheep fed a basal diet of Rhodes grass hay, Ethiopian Journal of Applied Sciences and Technology, 3(2): 13-24

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Abstract: The study was carried out to investigate the effect of substituting maize with kocho on intake, digestibility, nitrogen utilization and weight gain in intact Adilo sheep fed a basal diet of rhodes grass hay. Twenty four yearling male sheep with an initial body weight of 18.55 ± 0.38 kg (mean ± SE) were assigned to treatments using a completely randomized block design with four treatments. The sheep were blocked based on their initial body weight into six and each of the four treatment diets were randomly assigned to each animal in each block. Dietary treatments were comprised of 100% maize and 0% kocho (T1), 65% maize and 35% kocho (T2), 35% maize and 65% kocho (T3) and 0% maize and 100% kocho (T4) in a concentrate mixture. The concentrate portion was composed of noug (Guizotia abyssinica) cake, wheat bran, alfalfa powder, limestone and salt. Rhodes grass hay was offered as a basal diet ad libitum (~20% refusal). Two hundred gram concentrate mixture supplement was given twice a day in equal portions. A 70-day growth trial and an eight day digestibility trial were conducted. There were no significant differences (P>0.05) on intake, digestibility and weight gain among treatments. The study conducted inferred that kocho can replace maize without any adverse effect on nutrient intake, digestibility and weight gain. It is concluded that kocho could be used as an alternative ingredient to replace maize in concentrate mixture in areas where its economic advantages are feasible.

Keywords: Ensete ventricosum, kocho, southern Ethiopia, Adilo sheep

*Ajebu Nurfeta¹, Meseret Abie¹ and Tegene Negesse¹, 2013. On-farm Evaluation of the Effect of Urea Treatment and Concentrate Supplementation of Teff and Finger Millet Straws on Dry Matter Degradability, Feed Intake and Weight Gain of Washara sheep, Ethiopian Journal of Animal Production, 13(1): 103-107

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Abstract: The objective of this study was to evaluate the effects of feeding urea treated *Eleusine coracana* (finger) millet and teff straws and concentrate supplementation on dry matter (DM) degradability, intake and weight gain of Washera sheep. Thirty six 5 to 8 months old sheep with the initial body weight of 16.1 ±1.25 kg were used for the feeding trial which lasted for 83 days. The sheep were assigned to the treatments in a completely randomized design: T1 = urea treated millet straw + 200 g wheat bran, T2 = urea treated teff straw + 200 g wheat bran + 100 g noug seed cake, T4 = untreated teff straw + 100 g wheat bran + 100 g noug seed cake, T5 = urea treated millet straw + 100 g wheat bran + 100 g noug seed cake and T6 = urea treated teff straw + 100 g wheat bran + 100 g noug seed cake. Urea treatment of millet straw improved (P< 0.05) the intakes of total DM, organic matter (OM), crude protein (CP) and metabolizable energy (ME) compared with untreated straw (T1 vs T3). Supplementation of untreated millet straw with noug seed cake and wheat bran had less effect on intake of nutrients compared with urea treated straw (T3 vs T5) but further supplementation of treated straw with noug seed cake (T5) increased (P<0.05) the total DM, OM and CP intakes. Urea treatment of teff straw increased the total CP intake (T2 vs T4). Supplementation with noug seed cake increased (P< 0.05) the total DM, OM and CP intakes in both treated and untreated teff straw. Sheep fed T1, T3, T5 and T6 diets had similar weight gain but the gain in these treatment groups were higher than those sheep fed T2 and T4 diets. Urea treatment increased the in vitro OM digestibility of millet (71.1 vs 40.2%) and teff (56.8 vs 36.7%) straws. Moreover, at 48 hrs of incubation, urea treatment increased DM degradability of millet and teff straws by 13.7 and 9.6 percentage units, respectively. For better performance of sheep, there is a need to supplement treated straws with energy and protein sources.

Key words: Washera sheep, urea treatment, millet straw, teff straw, supplementation

*Ajebu Nurfeta and Yunus Abdu, 2014. Feeding value of different levels of malt sprout and katikala atella on nutrient utilization and growth performance of sheep fed basal diet of Rhodes grass hay, Trop Anim Health Prod, 46(3): 541-547

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Abstract: Nonconventional agro-industrial by-products such as traditional liquor residues (locally called katikala atella) are widely used by livestock farmers in Ethiopia. The objective of this experiment was to evaluate the supplementary value of katikala atella and malt sprout (MS) on performance of sheep fed a basal diet of Rhodes grass hay. Thirty intact yearling male sheep with an average initial body weight of 17.4±0.74 kg (mean±SD) were assigned to the treatments in a completely randomized block design: atella alone (T1), 75 % atella+25 % malt sprout (MS) (T2), 50 % atella+50 % MS (T3), 25 % atella+75 % MS (T4), MS alone (T5), and Rhodes grass hay alone (T6). Grass hay was fed ad libitum to all treatments. The total dry matter (DM) and organic matter (OM) intakes of sheep fed T4, T5, and T3 diets were the highest (P< 0.05), while sheep receiving T6 had the lowest DM intake. The highest (P< 0.05) total crude protein (CP) intake was for sheep fed T5 diet, while the lowest was for those fed T6 diet. Sheep receiving T3 diet had higher (P<0.05) DM, OM, CP, neutral detergent fiber (NDF), and acid detergent fiber (ADF) digestibility as compared with those fed T1, T2, and T6 diets. Sheep supplemented with 50–100 % malt sprout had similar (P> 0.05) DM, OM, CP, NDF, and ADF digestibility. The highest (P< 0.05) average daily gain was for sheep fed T3, T4, and T5 diets, while sheep in T6 lost body weight. Sheep fed T5 diet had the highest (P< 0.05) nitrogen retention, while those fed T6 diet had the lowest. The study has shown that a mixture diet consisting of equal parts of katikala atella and malt sprout (T3) are found to be superior in most of the required nutrient characteristics.

Key words: Atella, Malt sprout, Grass hay, Adilo sheep


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Abstract: A study was conducted to determine the effect of different land use systems on soil physical and chemical properties in Sodo Zuria Woreda of Wolaita zone Southern Ethiopia. Differences in soil properties
in different land use types at two depths (0-15 and 15-30 cm) were observed on many soil properties important to crop growth. Enset (*Ensete ventricosum*) fields had higher pH, electrical conductivity (EC), available P and Zn, exchangeable Ca and K which is attributed due to the addition of manure, whereas maize fields had lowest average K and Mg, cation exchange capacity (CEC), percentage of base saturation (PBS), total N and OC. These results suggest that land use has persistent, multi-decadal effects on the spatial heterogeneity of soil resources and also the need of land use and landscape research to determine ecologically sound and sustainable land use and management strategies.

**Key words**: Land use, Enset, grass land, manure, continuous cultivation, soil properties.

Ambachew Demessie¹, *Bal Ram Singh² and Rattan Lal³, 2013. Soil carbon and nitrogen stocks under chronosequence of farm and traditional agroforestry land uses in Gambo District, Southern Ethiopia Nutr Cycl Agroecosyst, 95(3): 365-375

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**Abstract**: Conversion of forests to farm lands without trees and farm lands with scattered trees (traditional agroforestry systems) may lead to decline of soil organic carbon (SOC) and N stocks provided that they have similar original status. This study was conducted on soils with the age chronosequences of 12, 20, 30, 40, 50 years of farm (F), traditional agroforestry (AF) and the adjacent natural forest (NF) lands. We studied the changes in the concentration and stocks of SOC, total N and their distribution in the soil profile of an Andic Paleustalfs in Gambo District, Southern Ethiopia. Soil samples were collected at 10, 20, 40, 60, 100 cm depth interval from pits of 1 m depth in all land use types and they were analyzed for their SOC and N stock. The results showed that the greater proportion of SOC and N was concentrated in 0–20 cm depth and that their concentration in AF and F land uses was significantly lower than that under the NF. Soils in traditional agroforestry land use showed a trend of higher SOC stocks in all chronosequences than those under the corresponding farm lands. The SOC stock under the chronosequence of 12–50 years of AF and F land uses varied from 28.2 to 98.9 Mg ha-1 or 12 to 43 % of the stock under the NF. The SOC was less by 6.2 Mg ha-1 year-1 for AF12 and 0.9 Mg ha-1 year-1 for AF50 compared with NF. The corresponding values for farm lands were 6.6 and 1.3 Mg ha-1 year-1. The N values of all land uses were also less than that of the NF. The SOC and N stocks tended to be less in farm lands than in the traditional agroforestry. However, the SOC stocks were not significantly higher with AF compared with F suggesting that the parkland systems as practiced is not sufficient to overcome other effects of cultivation.

**Key words**: Agroforestry ,Carbon stocks, Farm land Natural forest ,Soil nitrogen, Soil organic carbon


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**Abstract**: Plantation establishment using exotic species on disturbed cultivated and undisturbed primary forest soils is common in Gambo district, southern Ethiopia, but their effects on soil properties are not fully known. This study investigated the effects of plantation species on major soil physical and chemical properties and further evaluated the soil quality under different land uses. Soil samples in triplicates, collected under different plantations, were analysed for their physical and chemical properties. Based on these soil properties, an integrated soil quality index was determined. The soil bulk density (BD) varied from 0.72 to 0.80 cm³ in plantations established on primary forest land and natural forest and from 0.86 to 1.14 g
cm_3 in those plantations established on cultivated soils. Also significantly lower pore volume and infiltration rate were observed under plantations established on cultivated lands than those on primary forest soils. Higher water volume (% at _1500 kPa matric potential) was obtained in soils under Juniperus procera and natural forest compared with that under the rest of the plantations investigated. The concentration of soil organic carbon (SOC) varied from 3.4 to 10.2%, N from 0.3 to 1.0% and Av.P from 1.5 to 7.0% in soils under plantations and natural forest. Exchangeable cations generally showed a decreasing trend with depth in all land use types with minor exceptions. The concentrations of exchangeable Ca_2 varied from 6.5 to 22.7 cmol kg_1 and were significantly higher under Juniperus procera than under Eucalyptus species. The soil under plantations on previously cultivated lands showed soil quality index below 0.5 (the baseline value), while those established on undisturbed forest soil were generally above that value. The study results suggest that selecting species such as Juniperus procera and prolonging the harvesting period would improve and maintain the quality of soil properties.

Key words: Plantation species, previously cultivated lands, soil physical and chemical properties, undisturbed forest soil.


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Abstract: The effect of six plantation species in comparison to natural forest (NF) on soil organic carbon (SOC) and total nitrogen (TN) stocks, depth-wise distribution, biomass carbon (C), and N was investigated on plantations and cultivated lands on an Andic paleudalf soil in Southern Ethiopia. The SOC, N, and bulk density were determined from samples taken in 4 replicates from 10-, 20-, 40-, 60-, and 100-cm depth under each site. Similarly, the biomass C and N of the plantation species and understory vegetation were also determined. The SOC and N were concentrated in the 0- to 10-cm depth and decreased progressively to the 1-m depth. Next to the NF, Juniperous procera accrued higher SOC and N in all depths than the corresponding plantations. No evidence of significant difference on SOC and N distribution among plantations was observed below the 10-cm depth with minor exceptions. The plantations accrue from 133.62 to 213.73 Mg ha–1 or 59.1 to 94.5% SOC, 230.4 to 497.3 Mg ha–1 or 6.9 to 14.9% TBC and 420.37 to 672.80 Mg ha–1 or 12.5 to 20% total C-pool of that under the NF. The N stock under Juniperous procera was the highest, while the Soil Carbon and Nitrogen Stocks Under Plantations 497 lowest was under Eucalyptus globulus and Cupressus lusitanica. We suggest that SOC and N sequestration can be enhanced through mixed cropping and because the performance of the native species Juniperous procera is encouraging, it should be planted to restock its habitat.

Key words: soil organic carbon (SOC), soil nitrogen (N), natural forest (NF), total biomass carbon (TBC), plantation forest, Ethiopia


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Abstract: Litter fall and its decomposition rate play an important role in nutrient recycling, carbon budgeting and sustenance of soil productivity. Litter production and the decomposition rate were studied on commonly planted broad-leaved Eucalyptus (Eucalyptus globulus, Eucalyptus camaldulensis, Eucalyptus saligna) and coniferous (Juniperus procera, Cupressus lusitanica, Pinus patula) plantation species and compared with the
adjacent broad-leaved natural forest. The production of litter was recorded by litter traps and the decomposition rate was studied by nylon net bag technique. Litter production under broad-leaved plantation species and natural forest (that varied from 9.7 to 12.6 Mg ha\(^{-1}\) y\(^{-1}\)) was significantly higher (p<0.05) than that under coniferous species (that varied from 4.9 to 6.6 Mg ha\(^{-1}\) y\(^{-1}\)). The average concentration of C and N in fresh mature leaves was higher than in leaf-litter fall, implying that both C and N were either sorbed in the plant system or lost through decomposition, leaching or erosion during the leaf-litter fall period. The amount of N, which potentially returned to the soil through the leaf-litter fall, tended to be higher in natural forest than in Eucalyptus plantations. The residual litter mass in the litter bag declined with time for all species. The annual dry matter decay constant (k) varied from 0.07 m\(^{-1}\) in Pinus patula to 0.12 m\(^{-1}\) in Eucalyptus saligna. The half-time (t\(0.5\)) decay varied from 6.0 for Eucalyptus saligna to 9.7 months for Pinus patula. The results suggest that the decomposition rate in Pinus patula was relatively lower than the other species and the litter production under broad-leaved Eucalyptus was comparatively higher than that in coniferous species. Overall the litter decomposition was fast for all species. The higher litter production and its relative faster rate of decomposition is a positive aspect to be considered during species selection for the restoration of degraded habitats given other judicious management practices such as prolonging the rotation period are adhered to.

**Key words:** Broadleaved species, carbon budgeting, nutrient recycling, periodic characteristics, rotation period, species diversity, soil fertility, sustainability


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**Abstract:** Many funding organizations view on-farm research as having greater impact than ‘on-station’ trials, a feeling shared by farmers and pastoralists because of the opportunity to see and evaluate findings first-hand. Langston University provides technical assistance in a 5-year project supported by the U.S. Agency for International Development, entitled Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP), which includes on-farm research and demonstrations of useful feeding/nutrition practices. The ESGPIP partners with research and extension entities throughout Ethiopia in implementing specific activities. One effective strategy in on-farm research and demonstrations used by some partners involves group management of animals by Farmer Research Groups (FRG) situated in different villages. Four or five FRG have been used by ESGPIP implementing partners, with each consisting of 9 or 10 farmers contributing 3 or 6 animals. Funds were provided to construct a simple barn with three pens (10 animals per pen) at each FRG for group housing and feeding at night. One or two animals per farmer were subjected to each of three feeding treatments. Conversely, in other settings treatment imposition on individual farmers and their animals in multiple communities was most suitable. Both approaches allow for statistical analysis of data, desirable for publication of the findings and, perhaps more importantly, true value or meaning of any differences noted. With use of farmer-owned animals in some instances it may not be feasible to impose negative control treatments, but an appropriate common or standard supplemental feedstuff treatment allows for an adequate basis of comparison. For sustainability, on-farm research should include input by and intimate involvement of producers and participation of local technology transfer personnel.

**Key words:** Research, on-farm, demonstration, extension, technology transfer


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Abstract: The soils of the Delbo Wegene watershed of Southern Ethiopia were characterized along toposequence for the development of land management plan for sustainable soil management practices. Four pedons along toposequence were studied. Delbo Wegene watershed is located between 06°52' 45.9" and 06°53'34.8" N latitude and between 37°48' 10.5" and 37°48'42.4"E longitude, with altitude ranging from 2100 to 2300 m.a.s.l. The soils were generally dark reddish brown to very dark brown and very deep (>150 cm). The overall friable consistency, low bulk density (1.0 to 1.26 gm/cm³), sub angular to angular blocky structure, high total porosity (53 to 61%) indicated that the soils have good physical condition for plant growth. The soils were slightly (pH: 5.8) to moderately acidic (pH: 6.4). Organic carbon content, available micronutrients and cation exchangeable capacity of the soils decrease with soil depth. However, exchangeable cations increase with increasing soils depth. Available phosphorus content of the soils ranged from very low to high. However, available Cu content of the soils were marginal to deficient. The upper and middle pedons with argilic subsurface horizons were classified as Typic Paleustults (Soil Survey Staff, 1999). These soils correlate with Cutanic Luvisols (WRB, 2006). The lower and toe slope pedons with mollic epepedon and cambic subsurface horizon were classified as Typic Haplustepts. These soils correlate with Haplic Cambisols (WRB, 2006). The result indicated that the distribution and properties of the soils vary along the toposequence in the watershed.

Key words: Soil characteristics, soil classification, Delbo-Wegene watershed


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Abstract: The replacement value of dried Erythrina brucei leaf for cotton seed meal (CSM) on growth performance and carcass characteristics was evaluated. Twenty-five yearling buck goats (15.8±1.4 kg) were assigned into five treatments in a randomized complete block design: natural grass hay alone (T1) or supplemented with 100% CSM (T2), 67% CSM+33% E. brucei (T3), 33% CSM + 67% E. brucei (T4), and 100% E. brucei (T5) on dry matter (DM) basis. Supplemented goats consumed more (P<0.05) total DM and organic matter (OM) than the non-supplemented group, but the intakes were not influenced (P>0.05) by the proportion of the supplements. The highest (P<0.05) crude protein (CP) intake was observed in goats supplemented with CSM alone, whereas the lowest intake was observed in the non-supplemented group. Total CP intake decreased (P<0.05) with increasing levels of E. brucei in the supplement mixture. The supplemented goats gained more (P<0.05) weight than the control group. Apparent DM and OM digestibility was higher (P<0.05) in supplemented goats than in the non-supplemented ones, but similar (P>0.05) among the supplemented group. The digestibility of CP was higher (P<0.05) for supplemented goats, except in those goats fed E. brucei alone, than the non-supplemented group. Slaughter weight, empty body weight, hot carcass weight, dressing percentage, rib eye muscle area, and total edible offals were higher (P<0.05) for supplemented goats than for the non-supplemented ones. It could be concluded that E. brucei could be used as a substitute to CSM under smallholder production systems.

Key words: Feed intake, Growth performance, Carcass characteristics, Erythrina brucei Cotton seed meal, Goats


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Abstract: The study was conducted in and around Boditti town, Southern Ethiopia with the objective of characterizing milk production systems in the area. A total of 120 households were randomly selected from four Kebeles, two in Boditti town and the rest from surrounding. Two major dairy production systems, namely urban and rural or mixed crop/livestock production systems were identified. Average cattle holding per household in the area was 3.4 with 1.1 lactating cows. Husbandry practices such as feeding, watering, housing, breeding, milking, calf rearing, waste management, and record keeping were different in the two production systems. Overall, about 3.25 liters of milk was produced daily per household. Major constraints for dairy development in the area include: animal feeds, land and water scarcity, discouraging market, low rate of genetic improvement, etc. Rapid urbanization coupled with increase in human population and standard of living of the urban dwellers and conducive climate of the area can be considered as an opportunity for the development of dairy in the area. Therefore, market opportunity and linkages are the major issues for smallholder dairy development in addition to provision of the required services and resources, provision of credit, extension and training.

Key words: Mixed practices, rural, smallholder, urban


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Abstract: The study was carried out in and around Boditti town with the objective of assessing the microbial quality and chemical property of fresh whole milk produced in the area. Four Kebeles, two in Boditti town and the rest in the surrounding areas were randomly selected. A total of 40 households having at least one milking cow were randomly selected for milk sampling. The microbial counts of fresh whole milk samples produced in the area did not vary significantly between Kebeles with the mean total bacterial and coliform counts of 6.36 and 4.30 log CFU/ml, respectively. Values of both total bacterial and coliform counts in fresh milk samples considered were generally above acceptable limits. The overall mean fat, protein, total solids (TS), solids-not-fat (SNF) and ash contents of fresh whole milk was 5.22, 4.22, 12.75, 7.52, 2.66 and 0.64%, respectively. The result of the microbial investigation indicated poor bacteriological quality of fresh whole milk whereas the chemical composition was within acceptable ranges. Therefore, milk produced in the area should be heat treated before consumption and adequate sanitary measures should be taken at all stages from production to consumption to produce milk and milk products of superior quality and protect the health of the consumers.

Key words: Microbial quality, chemical property, fresh whole milk, Boditti, Ethiopia

Asrat Tera¹, *Tegene Neggese¹ and Aberra Melesse¹, 2009. The Effect of Partial Substitution of Plant Protein By Fishmeal Prepared Out of Cooked And Sun Dried Fish Offal on Feed Intake and Carcass Traits of Rhode Island Red Chicks, Ethiopian Journal of Sciences 32(1): 75-80

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Abstract: Effects of cooked and sun dried fish offal, fishmeal, on intake, growth and carcass traits of Rhode Island Red (RIR) chicks was evaluated at Wolaita Soddo, southern Ethiopia. After 14 days of uniform brooding of unsexed day old RIR chicks, a feeding trial, with 6 dietary groups (T1 to T6), 5 replicates each and 10 chicks per replicate, was run for 11 weeks when daily group feed intakes were recorded. Results showed that chicks fed T1 had significantly (p ≤ 0.01) lowest (68.5g dry matter (DM), 13.3g crude protein (CP), 0.54g calcium (Ca), 0.35g phosphorus (P) and 231kcal metabolizable energy (ME) head-1) but those on T6 had the highest daily intakes (77g DM, 14.8g CP, 1.81g Ca, 0.58g P and 243kcal ME head-1).
Slaughter weight was 1022g, 1234g, 1295g, and 1272g head-1 for T1, T2, T3, T4, T5 and T6, respectively. Commercial carcass weight (breast + thighs + drum sticks + wings + back) of the control (552g/head) was significantly (p< 0.01) lower than fishmeal groups (683g, 671g, 729g, 717g and 711g for T2, T3, T4, T5 and T6, respectively). Difference in weights of drum sticks, thighs, wings and back separately were significantly (p< 0.01) higher for fishmeal groups. Breast weight of T1 (160g) was significantly (p< 0.01) lower than T2 (196g), T3 (203g), T4 (219g), T5 (213) and T6 (217g). Total edible carcass weight, including skin, liver and gizzard of T1 was significantly lower (676g head-1, p< 0.01) than the rest of the groups (837g, 807g, 874g, 860g and 850g head-1 for T2, T3, T4, T5 and T6, respectively). Significantly (p≤ 0.05) lower Dressing % was obtained from T1 (54.0%) than T2 (55.3%), T3 (55.7%), T4 (56.2%), T5 (56.5%) and T6 (55.8%). Dressing percentage (on the basis of edible carcass) of T1 (66.1%) was also significantly (p< 0.05) lower than T2 (67.8%), T3 (67.1%), T4 (67.5%), T5 (67.6%) and T6 (66.8%). Males had significantly (p< 0.01) higher slaughter weight (1294g) and carcass weight (721g) than females (1138g and 633g, respectively), but they had similar breast weights and dressing %. It can thus be concluded that fishmeal inclusion in to diets of growing RIR chicken up to the levels of 16.6% of the DM of the diet did not affect health or carcass traits; however, best results were obtained at 9.96%.

Key words: Carcass traits, chicks, fishmeal, nutrient retention

Asrat Tera1, *Tegene Negesse2, and Aberra Melesse2, 2008. Effect of Rate of Inclusion of Fishmeal Prepared By Cooking and Sun Drying of Fish Offal on Feed Intake and Nutrient Retention of Growing Rhode Island Red Chicks, Ethiopian Journal of Sciences, 31(2): 151-156

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Abstract: Effect of cooked and sun dried fish offal on intake and nutrient retention of growing Rhode Island Red (RIR) chicks in southern Ethiopia was evaluated. Unsexed day old RIR chicks were uniformly brooded, vaccinated against Gumboro and Newcastle diseases. At the age of 14 days, 10 chicks were assigned to each of the 5 replicates of the 6 dietary groups, fed for 11 weeks and daily group feed intakes were recorded. The control diet (T1) consisted of Maize (34.1%), wheat short+bran (21.0%), limestone (1.20%), salt (0.5%), premix (0.1%), lysine (0.05%), methionine (0.05%), roasted soybean (27.0%) and noug cake (16.0%); the rest of the diets contained all ingredients in the control plus fishmeal at rates of 3.32% (T2), 6.64% (T3), 9.96% (T4), 13.28% (T5), and 16.6% (T6) of the diet and had 19.76, 18.89, 19.82, 18.44, 18.96 and 19.20% CP, respectively. At the beginning of the feeding trial, 13 chicks representing initial body weight of those in the trial were stunned by dislocation of the neck. At the end, one male and one female chick from each of the 3 replicates of each of the 6 treatment groups were systematically selected, tagged, fasted for 12 hours, weighed, and stunned by dislocation of the neck. All carcasses were kept intact in deep freezer at -20°C and then cut into small pieces in freezing condition, minced and dried in an oven at 65°C for 80 hours, ground, homogenized and chemically analyzed. Chicks fed T1 had significantly (p< 0.001) lowest (68.5g DM, 13.3 g CP, 0.54g Ca, 0.35g P and 231kcal ME head-1) but those on T6 had the highest daily nutrient intakes (77 g DM, 14.8 g CP, 1.81 g Ca, 0.58 g P and 243 kcal ME head-1). T1 (2.28) of all and T4 (2.65) among fishmeal groups viz T2 (3.01), T3 (2.92), T5 (2.86) and T6 (2.85) had the lowest (p<0.001) CP retention (CPR). Males had significantly (p< 0.001) higher CPR (2.9 g head-1d-1) than female (2.62 g head-1d-1). Energy retention of T1, T2, T3, T4, T5, T6 were 21.6, 28.7, 29.1, 27.0, 25.9 and 28.1 kcal head-1d-1, respectively, with significant differences (p< 0.01) only between T1 and fishmeal groups. Sex had no influence on energy retention. Based on the results of the present study fishmeal can be incorporated up to 16.6% of the diet of RIR chicks, however, best results of protein retention was obtained at 3.32%, and of energy retention at 6.64%.

Key words: Chicks, fishmeal, nutrient retention


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Abstract: The effects of cooked and sun-dried fish offal meal (fishmeal) on feed intake, weight gain, and feed conversion efficiency of RIR chicks were assessed at Wolayta Soddo, southern Ethiopia. Unsexed day-old RIR chicks were brooded uniformly for 14 days and then vaccinated against Gumboro and New Castle Diseases. A feeding trial with six dietary groups, 5 replicates each and 10 chicks per replicate was run for 11 weeks, and daily feed intake and weekly individual body weights were recorded. The control diet (T1) consisted of fishmeal (0%), maize (34.1), wheat short + bran (21%), limestone (1.20%), salt (0.5%), premix (0.1%), lysine (0.05%), methionine (0.05%), roasted soybean (27%) and noug cake (16%); the rest of the diets contained ingredients in the control plus fishmeal included at the rates of 3.32% (T2), 6.64% (T3), 9.96% (T4), 13.28% (T5) and 16.6% (T6) of the diet replacing 7.6, 15.3, 22.9, 30.5 and 38.2% of the protein of the control diet. T1, T2, T3, T4, T5 and T6 had 19.76, 18.89, 19.82, 18.44, 18.96 and 19.20% CP, respectively. Chicks fed T1 had the lowest (P< 0.001) daily intakes (68.5 g DM, 13.3 g CP, 0.54 g Ca, 0.35 g P and 231 kcal ME head⁻¹), but those on T6 had the highest daily intakes (77 g DM, 14.8 g CP, 1.81 g Ca, 0.58 g P and 243 kcal ME head⁻¹). Other groups fell in between these ranges. Higher (p< 0.01) mean daily body weight gains (MDBWG) were observed in fishmeal groups compared to the control. The MDBWG of T1, T2, T3, T4, T5 and T6 were 10.65 g, 13.41 g, 12.82 g, 13.46 g, 13.2, and 12.78 g head⁻¹. MDBWG was significantly (P< 0.01) and positively affected by the age of the chicken up to 2.5 to 3 months, but it declined from then onwards. Fishmeal group utilized feed [6.03 (T2), 6.12 (T3), 5.83 (T4), 6.03 (T5) and 6.35 (T6)] g feed/g MDBWG] more efficiently (p< 0.01) than the control group (6.79 feed/g MDBWG, T1). The feed conversion ratio decreased with advance with age. Differences in protein efficiency ratios (PER) were highly significant (p< 0.001) between fishmeal groups (1.025, 0.973, 1.098, 1.013 and 0.957 for T2, T3, T4, T5 and T6, respectively and the control (T1, 0.901). Mortality of chicks was not encountered during the trial period. Cooked and sun-dried fish offal can be incorporated in upto 16.6% of the diets of growing RIR chickens without affecting intake and growth; however, beat results were obtained from 9.96% inclusion rate.

Key words: Chicks; Fishmeal; Growth; Intake

* Aster Abebe¹², Adugna Tolea²³, Øystein Holand¹, Tormod Ådnøy¹ and Lars Olav Eik¹⁴, 2012. Seasonal variation in nutritive value of some browse and grass species in Borana rangeland, southern Ethiopia, Tropical and Subtropical Agroecosystems, 15: 261-271

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Summary: The Borana rangeland has diverse species of woody and herbaceous plants which are useful as forage. Chemical analysis, in vitro dry matter digestibility (IVDMD) and in sacco degradability study were conducted on feed samples collected from browse and grass species during the hot dry and main rainy seasons. Chemical analysis and IVDMD were done for Acacia brevispica, A. nilotica, A. seyal, A. tortilis, Balanites aegyptiaca, Grewia bicolor, G. tembensis, Rhus natatensis, Vernonia cinerascens and Maracca and grass species Cenchrus ciliaris, Chrysopogon acheri and P. mezianum while in sacco degradability was done for A. nilotica, B. aegyptiaca, G. bicolor, R. natatensis and C. acheri. The crude protein content (CP) of the browse species was higher in the rainy season except A. seyal which had higher value in the dry season (210 g/kg DM). The condensed tannin (CT) concentration ranged from 1.2 to 332 g/kg DM in B. aegyptiaca and A. tortilis, respectively. The NDF and ADF were highest in G. tembensis and G. bicolor while lowest values were in A. nilotica and A. seyal in the dry season, respectively. During the rainy season G. tembensis had highest NDF (750.9 g/kg DM) and lowest was in A. nilotica (128.1 g/kg DM). The IVDMD among the browse varied from 965.7 to 718.9 and 974.7 to 676.3 in the dry and rainy seasons, respectively. In grass species CP was from 56 to 78. The NDF ranged from 728 to 749 g/kg DM and from 673 to 709 g/kg DM in dry and rainy seasons, respectively. The IVDMD was higher in the rainy season (698.2-811.5 vs 577.8-620.2). The in sacco DM degradability was highest for A. nilotica followed by B. aegyptiaca and lowest was in C. acheri. The browse had high feed potential based on chemical and digestibility/degradability values recorded in this study while grasses could be considered as moderate. Among the grasses, C. ciliaris and C. acheri are promising in terms of the digestibility values. However this conclusion needs to be supported by animal experiments and knowledge of the local community.
Academic Success Depends on Research and Publications

Key words: Borana pastoralists, Digestibility, Hot dry season, Main rainy season.

*Aster Abebe1,2, Lars Olav Eik2, Øystein Holand2, Tormod Ådnøy2 and Adugna Tolera2,3, 2012. Pastoralists’ perceptions of feed scarcity and livestock poisoning in southern rangelands, Ethiopia, Tropical Animal Production and Health, 44: 149–157

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Abstract: A survey was conducted between April and July 2007 to generate information on dry season feeding management and livestock poisoning in the southern rangelands of Ethiopia. A total of 119 pastoralists were interviewed using a semi-structured questionnaire. Moreover, additional information was obtained through informal discussions. The study revealed that pastoralists have rich knowledge of natural resource management and utilization and employ various strategies such as migration, collection of grasses and pods, and cutting branches to overcome feed scarcity during dry/drought periods. Migration of livestock and people to areas with better grazing is the widely used strategy. However, the implementation of this strategy is diminishing as a result of changes such as bush encroachment, expansion of settlements, and crop cultivation in dry-season grazing lands. The respondents also indicated the presence of poisonous plants in the rangeland, and about 20 such plants were identified by the respondents. Various species and classes of livestock are reported to be affected by toxic plants particularly in the dry and early rainy seasons when feed is in short supply. A more extensive survey is required to document all poisonous plants in the rangelands and to identify the major toxic principles in the different species. Future development interventions should consider the prevailing constraints and potentials of the rangelands with active participation of the pastoralists.

Key words: Dry season, Feed shortage, Pastoralists, Poisonous plants, Southern rangelands

*Ayana Angassa1,3, Gufu Oba2 and Adugna Tolera1, 2012. Bush encroachment control demonstrations and management implications on herbaceous species in savannas of southern Ethiopia, Tropical and Subtropical Agroecosystems, 15: 173-185

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Summary: Proper management of bush control methods need to be effectively demonstrated to resource users. In this paper, we evaluated effects of disturbance control (CO) (i.e., government policy approach in the conservation of natural resources), tree cutting and fire (C+F), tree cutting, fire and grazing (C+F+G), the old traditional method of applying fire and grazing (F+G) by herders, grazing with bush cover (GBC) (i.e., current system of land use system by herders in Borana) and tree cutting alone (C) (i.e., Non-governmental Organizations approach in rangeland improvement) on herbaceous species composition, abundance, biomass, basal cover and species diversity in southern Ethiopia. The disturbance control demonstration showed no advantage in terms of biomass and basal cover over other treatments, although herbaceous species richness was improved. Bush removal methods such as tree cutting and fire, tree cutting followed by fire and grazing, fire and grazing, and tree cutting alone improved herbaceous biomass, basal cover and species diversity, while grazing alone greatly reduced herbaceous biomass. Tree cutting and fire treatments seemed superior in terms of herbaceous biomass, while conservation of herbaceous species diversity was improved more by the traditional method of fire and grazing, and tree cutting. With the exception of species richness, protection from disturbance showed no advantage. Only fire and grazing methods can reasonably be applied for the control of bush encroachment with the overall objective of promoting biomass production and species diversity.

Key words: Disturbance control; tree cutting, fire, grazing; policy implication; public education; Ethiopia.
Abstract: We tested soil characteristics and nutrient availability linked to settlement age, grazing pressure and fire regime in southern Ethiopia. Settlement categories included: “non-settlement” (no evidence of settlement), “recent” (<15 years) and “old” (>40 years). Grazing pressure was represented by “enclosures” vs. “grazed areas”, while fire regime denoted by “burned” vs. “unburned” sites. Soil properties and vegetation characteristics were analyzed for different treatments. Our results showed that higher sand content could reduce soil pH values with increased leaching. Low soil pH could also occur due to the high rate of organic matter decomposition and uptake of cations by plants. We recorded higher nitrogen (N) and phosphorus (P) contents with N ¼ 0.16 _ 0.01% and P ¼ 21.10 - 1.28 mg kg$^{-1}$ in recent compared to old settlement. Electrical conductance (EC) was positively influenced by soil pH. We observed significantly higher EC under increased grazing. Higher soil pH, N, organic carbon (OC) and cation exchange capacity (CEC) were recorded in recent compared to non-settlement. Fire greatly improved soil condition, while heavy grazing reduced grass biomass. We suggest the need for appropriate land management and soil conservation by minimizing impacts of cultivation on soil characteristics. We also propose the reintroduction of fire to restore rangeland biodiversity.

Key words: Settlement lands, Non-settlement lands, Grazing pressure, Enclosures, Burning regime

Abstract: The dynamics of bush encroachment worldwide has often been implicated for the loss of herbaceous vegetation in savannah ecosystems, and is associated with a decline in forage production. Various management prescriptions have been considered in order to restore herbaceous vegetation and improve forage production. This study was designed to evaluate effects of combinations of different treatment factors including hand clearing, prescribed fire and grazing compared to the control treatments on responses of herbaceous vegetation variables in the savannahs of southern Ethiopia. Field experiment was conducted on two ranch sites at different locations and altitude ranges over a period of 2 years between November 2003 and June 2005. The study consisted of five treatments: (1) the control treatment (CC+CF+CG-T1); (2) Hand clearing + prescribed fire + no grazing (C+F+CGT2); (3) Hand clearing + prescribed fire + grazing (C+F+G-T3); (4) no clearing + no fire + grazing (CC+CF+G-T4); (5) no clearing + fire + grazing (CC+F+G-T5); and (6) Hand clearing + no fire + no grazing (C+CF+CG-T6). The ungrazed treatments were fenced and protected from grazing, while grazed treatment plots were unfenced and open to grazing. Hand clearing and prescribed fire with no grazing (T2) resulted in significant increases in herbaceous biomass, density, basal cover of perennial grasses, species richness and diversity, particularly during the second phase of the post-treatment effects. Herbaceous vegetation variables were increased during the second phase of post-treatment effects with all treatments (exception being biomass, density and basal cover with T4 and T1). Generally, our results showed a significant increase in terms of herbaceous biomass and basal cover with T2 and T5 during the second phase of post-treatment. A similar level of response was recorded for herbaceous density with T3, while more species richness and diversity were recorded with T4 and T6. This finding suggests that fire treatment with grazing adversely affected

*Ayana Angassa$^{1,5}$, Sheleme Beyene$^2$, Gufu Oba$^{1,3}$, Treydte A.C$^4$, Linstädter A$^5$ and Sauerborn J$^4$, 2012. Savanna land use and its effect on soil characteristics in southern Ethiopia, *Journal of Arid Environments*, 81: 67-76

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Abstract: The dynamics of bush encroachment worldwide has often been implicated for the loss of herbaceous vegetation in savannah ecosystems, and is associated with a decline in forage production. Various management prescriptions have been considered in order to restore herbaceous vegetation and improve forage production. This study was designed to evaluate effects of combinations of different treatment factors including hand clearing, prescribed fire and grazing compared to the control treatments on responses of herbaceous vegetation variables in the savannahs of southern Ethiopia. Field experiment was conducted on two ranch sites at different locations and altitude ranges over a period of 2 years between November 2003 and June 2005. The study consisted of five treatments: (1) the control treatment (CC+CF+CG-T1); (2) Hand clearing + prescribed fire + no grazing (C+F+CGT2); (3) Hand clearing + prescribed fire + grazing (C+F+G-T3); (4) no clearing + no fire + grazing (CC+CF+G-T4); (5) no clearing + fire + grazing (CC+F+G-T5); and (6) Hand clearing + no fire + no grazing (C+CF+CG-T6). The ungrazed treatments were fenced and protected from grazing, while grazed treatment plots were unfenced and open to grazing. Hand clearing and prescribed fire with no grazing (T2) resulted in significant increases in herbaceous biomass, density, basal cover of perennial grasses, species richness and diversity, particularly during the second phase of the post-treatment effects. Herbaceous vegetation variables were increased during the second phase of post-treatment effects with all treatments (exception being biomass, density and basal cover with T4 and T1). Generally, our results showed a significant increase in terms of herbaceous biomass and basal cover with T2 and T5 during the second phase of post-treatment. A similar level of response was recorded for herbaceous density with T3, while more species richness and diversity were recorded with T4 and T6. This finding suggests that fire treatment with grazing adversely affected
herbaceous vegetation, specifically biomass, density and basal cover soon after treatment. Thus, following fire treatment, exclusion of grazers from burned areas is required to provide herbaceous vegetation the opportunity to restore.

**Key words**: Grazing, hand clearing, herbaceous vegetation, prescribed fire, southern Ethiopia


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**Abstract**: This study was carried out to assess the effect of season, elevation, bush encroachment and location on the condition of the rangelands in Borana. A survey was conducted during the long and short rainy seasons of 1998 at a time when most grass species were at full flowering stage on a government ranch and 6 communal grazing areas. Each of the study areas covered 3 elevation zones: low (1250–1500 m), medium (1500–1650 m) and high (1650–2000 m). The assessment of range condition was based on the botanical composition of the herbaceous layer, basal cover, litter cover, relative number of seedlings, size distribution of dominant grasses and soil condition. The overall results showed that season, bush encroachment and location of the rangeland had significant effects on condition of the rangelands. Overall range condition scores were higher during the long rainy season than in the short rainy season and in range sites that were not affected by bush encroachment. Moreover, the total range condition score was higher on the ranch than in some communal grazing areas. Expansion of cultivation for crop production, establishment of permanent sources of water and permanent settlement were considered to be the main contributing factors to the relatively lower condition scores observed in the communal grazing areas because of increased grazing pressure.

**Betscha S¹, Hoelker M¹, Salilew-Wondim D¹, Held E¹, Rings F¹, Grosse-Brinkhause C¹, Cinar M.U¹, Havlicek V², Besenfelder U², Tholen E¹, Loof C¹, Schellander K¹ and *Tesfaye D¹, 2013. Transcriptome profile of bovine elongated conceptus obtained from SCNT and IVP pregnancies, Mol Reprod Dev. 80(4): 315-333**

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**Abstract**: In the present study we analyzed the gene expression changes induced by somatic cell nuclear transfer (SCNT) and in vitro production (IVP) in bovine elongated embryos using Affymetrix bovine genome array. For this, Day-16 bovine embryos from SCNT, IVP, and artificial insemination (AI) were recovered from recipients and used for transcriptome analysis. Despite comparable in vivo development rates, considerable reduction in elongation size was observed in SCNT compared to non-cloned embryos (93.3 mm for SCNT vs. 186.6 mm and 196.3 mm for IVP and AI embryos, respectively). Gene expression analysis revealed that the transcript levels of 477 genes, which are involved in various pathways including arginine and proline or glycerolipid and fatty acid metabolism, were significantly altered in SCNT compared to AI embryos. Similarly, 365 genes were differentially expressed in IVP embryos compared to AI. Thus, several pathways including TNRF-1 signaling and tight junction pathways were affected. To predict whether the altered transcripts were associated with culture condition or errors in transcriptional reprogramming, unique or common differentially expressed genes were analyzed in SCNT and IVP embryos compared to AI or fibroblast donor cells. Accordingly, 71 transcripts were found to be not transcriptionally reprogrammed, as their expression resembled the donor cells more than AI embryos; the remaining transcripts were either partially or incompletely reprogrammed. In conclusion, the present study identified deviations in elongation size, gene expression, and the corresponding molecular pathways in Day-16 SCNT and IVP conceptuses compared to their AI counterparts, which may subsequently be associated with the outcome of fetal development.

**Key words**: Elongated embryos, transcriptional reprogramming, gene expression
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Betsha S1, Saliliew-Wondim D1, Havlicek V2, Besenfelder U2, Rings F1, Hoelker M1, Schellander K1, and Tesfaye D1, 2012. 28 global gene expression analysis of elongated embryos produced by somatic cell nuclear transfer and in vitro fertilization, Reproduction Fertility and Development, 24(1):126

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Abstract: Despite their ability to reach to the blastocyst stage, nuclear transfer embryos showed various abnormalities with respect to pregnancy outcome. We hypothesised that once cloned embryos were transferred to a suitable recipient the conceptus and endometrial interaction during peri-implantation stage was a remarkable step that determines the pregnancy outcome. In order to elucidate the molecular mechanisms underlining this phenomenon, the present experiment was conducted to compare the transcriptome profile of Day-16 elongated embryos derived from somatic cell nuclear transfer (SCNT) and fertilized controls, namely, artificially inseminated (AI) and in vitro fertilized (IVF) using bovine genome Affymetrix array. Following total RNA isolation from 3 replicates of each group, biotin-labeled cRNA was hybridized on 9 bovine chips. Data were normalized by using guanine cytosine robust multi-array analysis (GCRMA) and analysis was performed using the LIMMA package in R software. The present findings demonstrate that the gene expression profile of SCNT elongated embryos closely resembled those of the in vitro fertilized group. Only 10 genes were found to be differentially regulated between SCNT and IVF embryos ($P \leq 0.05$, fold change $\geq 2$ and false discovery rate 20%). On the other hand 303 and 336 genes were differentially expressed in IVF vs AI and NT vs AI embryos comparisons, respectively. Majority of the transcripts were found to be down-regulated on IVF embryos, whereas only 21 transcripts were up-regulated. Moreover, 158 and 178 genes were up- and down-regulated, respectively, in NT embryos as compared with AI. The NT embryos were found to be enriched with transcripts responsible for lipid metabolism (ACOX1, ACOT4 and ACOT8) and molecular transport (B4GALT1, ERBB3, MIF and PRKAG2) compared with AI. Moreover, genes involved in cell movement (CD97, CTSL1, F2R, ITGA and ITGAV) were highly abundant in IVF embryos compared with AI. Ingenuity pathway analysis of differentially regulated genes showed that metabolic and tight junction pathways and the genes involved in these pathways were activated in NT and IVP elongated embryos, respectively, as compared with AI. In conclusion, elongated embryos from NT and IVP pregnancies show differences in expression of genes involved in various biological processes compared with their AI counterparts.


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Abstract: A digestibility and nitrogen (N) balance experiment was conducted using twenty yearling male Somali goats weighing 23.4 +/- 2.02 (mean +/- SD). The objectives of the study were to evaluate the effects of supplementation with graded levels of mixture of groundnut cake and wheat bran at a ratio of 3:1 on DM basis on feed intake, apparent digestibility and N balance in Somali goats. The experimental design was a completely randomized design consisting of five animals in each treatment. The dietary treatments included ad libitum feeding of hay (T1, control), and daily supplementation with 200 (T2, low) 300 (T3, medium) and 400 g DM (T4, high) of the concentrate mix. Increased level of supplementation reduced ($P < 0.001$) daily hay DM intake. Digestibility of crude protein (CP) was higher ($P < 0.001$) for the supplemented goats. Urinary nitrogen, total nitrogen excretion and retention increased ($P < 0.01$) with the level of supplementation. It was concluded that supplementation with groundnut -wheat bran mixture promoted feed intake and digestibility of DM, CP, and N retention in Somali goats fed hay. However, supplementation at the medium level appeared to be more effective since it promoted similar N balance with the high level of supplementation.

Keywords: Digestibility, Feed intake, N- balance, Groundnut cake, Somali goats, Supplementation, Wheat bran

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Abstract: East Shewa in central Ethiopia represents a smallholder crop–livestock mixed farming system in which crops and livestock play a mutually supportive role. Formal and informal surveys were carried out to assess the major constraints in livestock production. The survey revealed that shortages of feed resources constituted a major restriction to raising livestock productivity. Livestock have multiple roles in sustaining the livelihoods of rural communities, the vital one being draught power for crop production. The study stresses that improving the livelihoods of rural communities in mixed farming systems calls for multidisciplinary approaches to address constraints faced in both livestock and crop production.

Key words: Central Highlands, East Shewa, Ethiopia, Feed Shortage, Livestock Production, Mixed Farming


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Abstract: A survey was conducted in two regional states of Ethiopia, the Amhara National Regional State (ANRS) and the Southern Nations Nationalities and Peoples Regional State (SNNPRS), to generate information about the cultivation and utilisation of Millettia ferruginea (Hochst) Baker, including use of the plant as livestock feed. Two districts from each Regional State, 4 peasant associations (PAs) from each district and 10 households from each PA were purposively selected based on availability and recognition in the area of M. ferruginea. Data were collected using questionnaire. The period from February to May was reported as critical feed shortage seasons and SNNPRS respondents noted M. ferruginea as a feed resource was used to balance deficits during times of feed shortage. All respondents from SNNPRS and about 41% from ANRS used M. ferruginea as livestock feed. Some respondents from ANRS were however, unaware of the use of M. ferruginea as animal feed. Leaves, flowers and twigs of M. ferruginea were mentioned as edible parts of the plant by cattle, sheep and goats. Feeding M. ferruginea in mixture with other feedstuffs is a common practice in SNNPRS, while the sole M. ferruginea is fed in ANRS. All respondents from SNNPRS had a positive impression on the feeding value of M. ferruginea and indicated improved growth and milk output, no abortion, health problem and deaths of animals was observed due to M. ferruginea feeding. Conversely, the level of understanding of the feeding value of M. ferruginea in ANRS appeared to be low. Other uses of M. ferruginea noted by respondents include use for fishing, firewood, bee foraging, local construction materials and to make household utensils, to improve soil fertility, to provide shade to companion crops, as source of immediate cash income and as pesticide. These and other unmentioned good biological attributes of M. ferruginea therefore, makes it an appropriate choice for its inclusion in agroforestry systems and the tree can contribute to livestock production through provision of feed.

Key words: Endemic, feed, survey


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Abstract: Chemical composition and in vitro gas production of vetch (Vicia sativa) and some browse and grass species from northern Ethiopia were investigated. Vetch (fresh cut) was sampled in September and vetch hay samples were taken in October both during the early dry period. Samples of the browse and grass species were taken once per month during the rainy (June-August) and early dry (September-November) seasons in each year of the study period. Big variation was observed in the chemical composition of the browse and grass species. The browse species had relatively higher crude protein (CP) and acid detergent lignin (ADL) contents and lower neutral detergent fibre (NDF) contents than the grass species during both seasons. The highest CP content was observed in Albizia amara (24.7%) in the rainy season and in the fresh cut vetch (24.3%) in the dry season. Among the grass species, Digitaria abyssinica and Panicum miliaceum had relatively high CP contents during both the rainy and early dry seasons. Panicum coloratum had the highest NDF content in both seasons. The potential gas production was the highest (71.5 ml/0.2 g DM) in fresh cut vetch and the lowest (12.5 ml/0.2 g DM) in Ximenia american. The rate of gas production was the highest (0.081 ml h⁻¹) in Balanites aegyptica and the lowest (0.019 ml h⁻¹) in Combretum molle. Gas production was higher in fresh cut vetch than in the vetch hay, while the rate of gas production was higher in the hay than in the fresh cut vetch. In general, most of the browse species considered in this study had comparable CP and NDF contents to vetch and could be used as dry season supplementation for goats and other ruminants. However, further study is needed to understand the underlying causes of low gas production in some of the browse species and to evaluate animal response to supplementation of the promising browse species.

Key words: Chemical composition, in vitro gas production, vetch; browse, grasses

*Berhanu Nega Wasihun¹, Joseph A. Kwarteng² and Ernest L. Okorley², 2014. Farmers’ perception of their level of participation in extension in Ethiopia: Policy implications, Journal of Agricultural Extension and Rural Development, 6(2): 80-86

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Abstract: This study examined farmers’ perception of their level of participation in Public Agricultural Extension Service (PAES) in Soddo-zuria Woreda in Southern Ethiopia vis-à-vis seven selected farmers’ characteristics; namely, sex, age, educational status, wealth status, farming experience, experience with extension and frequency of contact with extension agents. For this study, 225 farmers were randomly selected and interviewed with a semi-structured questionnaire. The study showed that farmers in Soddo-zuria Woreda perceived their level of participation to be low, and had significant correlation with sex, educational status, wealth status and frequency of contact with extension agents. Female, illiterate and poor farmers’ perception of participation in the PAES was found to be lower than their male, literate and resource-rich counterparts. In a regression analysis, sex, educational status and wealth status explained 42.2% of the variance in farmers’ perceived level of participation in the PAES, with educational status alone contributing about 35%. To enhance farmers’ participation in the PAES, the Soddo-zuria Woreda Bureau of Agriculture and Rural Development need to properly mainstream gender, combine pro-poor development strategies and integrate literacy programmes into the routine extension activities.

Key words: Ethiopia, farmers’ perception, farmers’ participation, public agricultural extension, gender disparity.

*Berhanu Nega Wasihun¹, Kwarteng J.A.², and Okorley E.L.², 2013. Professional and technical competencies of extension agents as perceived by male and female farmers and the extension agents themselves: The need for data source triangulation, Journal of Agriculture and Biodiversity Research, 2(1): 11-16

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Abstract: The study examined professional and technical competencies of agricultural extension agents from the perspectives of male and female farmers, and Extension Agents (EAs) themselves in Soddo district of Southern Ethiopia. The competency areas were identified from EAs’ job description, extension guide booklet, and through discussion with staff of the district agricultural office. Accordingly, 14 and 21 items were identified on professional and technical competency areas of EAs, respectively. Likert type scales were developed to measure both types of competency levels. For the study, 225 farmers (177 male and 48 female) selected through stratified and systematic sampling procedures, and all EAs that work in the district, with a turnout of 85 (67 male and 18 female), were taken from the district. Data were collected using pretested semi-structured questionnaires. The findings indicated that professional competency rates of EAs were 2.26 and 2.99 (low and high) from farmers and EAs’ perspective, respectively. Likewise, the technical competencies of the EAs were 2.77 (farmers) and 3.01 (EAs). Both these mean values lie in the high category of the scale. Among farmers, female farmers perceived the two competency levels (professional 2.11, technical 2.65) significantly lower (p< 0.05) than that of the male farmers (professional 2.30, technical 2.80). The EAs’ perception of the two competency levels (professional 2.99, technical 3.01) were also higher than that of the farmers indicating that the self assessment was a bit on the high side. The findings indicate the importance of improving professional competency of EAs, data triangulation in extension decisions, and gender-mainstreaming in the routine extension activities.

Key words: Agricultural extension agents, professional competency, technical competency, data source triangulation, male farmers, female farmers.


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Abstract: This study was conducted in Adami Tullu Jiddo Kombolcha district, Oromia Regional State, to assess the major available feed resources in the area and to identify and rank feeding problems and possible improvement options for livestock feeding in the district. Multi-stage sampling techniques were used to select the study sites. Sixty respondents were selected from rural and peri-urban Kebeles. The total annual feed DM available was higher (P< 0.05) in rural (13.98 tons) than in the peri-urban (9.45 tons) kebeles. An average of 11.72 tons of feed DM was produced per household from the major available feed resources, in which 74.57% was obtained from crop residues. A total of 419.4 and 283.5 tones DM/year vs 423.6 and 394.3 tones DM/year was the requirements in rural and peri-urban areas, respectively. Hence, the study indicates that the available feed DM satisfies 99% and 71.9% of DM requirements of rural and peri-urban sites, respectively. The estimated annual DM requirements for maintenance were 13.63 tons with a deficit of 1.91 tons. Feed shortage, water scarcity, disease and low productivity of animals were assessed to be the major livestock production constraints.

Key words: Crop residues; feed availability; feed balance; feed requirement; urban-peri urban.

*Dawit Assefa1, Ajebu Nurfeta2 and Sandip Banerjee2, 2013. Effects of molasses level in a concentrate mixture on performances of crossbred heifer calves fed a basal diet of maize stover. Journal of Cell and Animal Biology, 7(1): 1-8

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Abstract: This study was conducted to evaluate the growth performance and feed intake of crossbred (Boran x Holstein Friesian) female calves fed different levels of molasses in concentrate mixture using 24 yearlings calves with average initial weight of 142.4±20.7 kg which lasted for 90 days. The calves were assigned into treatments having 0 (T1), 15 (T2), 30 (T3) and 50% (T4) molasses which replaced wheat bran in concentrate mixture using randomized complete block design into six blocks of four animals. The dry matter (DM) degradability was determined by incubating 3 g of feed samples in fistulated steers fed natural pasture hay ad libitum supplemented with 2 kg of concentrate. The total DM and organic matter (OM) intake for T2 and T3
diets were higher (P< 0.05) than those fed T1 and T4 diets. The stover DM and OM intake for T2 and T3 diets were higher (p<0.05) than for other treatments. The highest (p<0.05) crude protein intake was observed in calves fed T3 diets. Metabolizable energy (ME) intake was higher (P<0.05) for calves fed on T2 and T3 diets, respectively. Calves fed on T2, T3 and T4 diets had higher average daily gain compared to those fed T1 diet. The DM degradability after 4, 8, 24, 48, and 96 h of incubation was higher (P < 0.05) for T4 than that of T1. Based on intake of DM, OM and ME and growth performance, 15 and 30% molasses could be used as a replacement to wheat bran in the ration of heifers fed maize stover with good performance.

**Key words:** Molasses, performance, crossbred, calves, maize stover, Ethiopia.


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**Abstract:** In Ethiopia, though rural women constitute more than half of the productive work force of agriculture-the most important economic sector of the country, they have poor access to land use and administration rights. However, recent findings on rural women’s access to land specific to Oromia region is found to be in short, and hence this study was initiated with an aim to assess the status of rural women’s access to land in the region. The results were drawn from data obtained through extensive household surveys and qualitative strategies conducted in 72 rural and geo-demographically representative kebeles found in the region. The findings reveal that only half of the women are; registered in their names out of the total male-headed households (MHHs) registered for their lands, and participating in making decisions across range of the land use and administration issues in consultation with their husbands. Besides, women’s participation in land dispute resolutions is negligible, and access to land right for the second and consecutive wives is still at stake. On the other side, level of access to land for rural women during inheritance and divorce was found to be encouraging. To this end, it can be concluded that rural women’s access to land rights is far from substantial level and hence land laws, policies, proclamations, and strategies should be made pro-gender and customized with local systems particularly to enhance the land related decision making behaviors of spouses at household level.

**Key Words:** Rural Women, Access to Land, Use Rights, Oromia, Ethiopia

*Deribe Gemiyo1,4, Girma Abebe2 and Azage Tegegne3, 2014. Influences of non-genetic factors on early growth of Adilo lambs under smallholder management systems, southern Ethiopia, Tropical Animal Health and Production, 46(2): 323-329*

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**Abstract:** Stagnant early growth and mortality are the major impediments for sheep production in southern Ethiopia. We evaluated the effects of non-genetic factors on early growth performance of lambs in Halaba district with 467 lambs owned by 60 households. Body weights (kilograms) of lambs at birth, 30, 60, 90, 120, and 150 days were 2.30 ± 0.03, 4.45 ± 0.11, 6.94 ± 0.13, 10.4 ± 0.19, 13.3 ± 0.19, and 15.7 ± 0.20, respectively. The average daily gain (ADG; gram) from birth to 30, 60, 90, 120, and 150 days were 71.18 ± 8.18, 77.18 ± 2.19, 89.20 ± 1.98, 91.18 ± 1.51, and 90.68 ± 1.27, respectively. Season effect was significant (p< 0.05) for weight at birth, 30, and 120 days. Similarly, season of birth influenced (p< 0.05) ADG (gram) at all ages except from birth to 60 days. Single-born lambs were heavier over multiple births (p< 0.01), 90 (p< 0.001) and 120 days (p< 0.05) and higher (p< 0.001) ADG from birth to 90 days. There were significant interaction effects of parity by sex at birth (p< 0.01) and parity by type of birth (p< 0.001) and 90 days (p< 0.01). From the non-genetic factors estimated in this study, season and type of birth, and their interaction had
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a more profound effect at early growth of lambs, and they need to be considered in the improvement plan of sheep under Halaba arid to semi-arid environments. Efforts geared towards planned breeding, improved nutrition, and health would assist farmers to exploit these indigenous and adaptable sheep resources efficiently.

**Key words**: Growth, Lamb, Non-genetic factor, Smallholder, South Ethiopia

**Dinku Dessalegn¹, *Sheleme Beyene¹, Nand Ram, Fran Walley², Tekleab S. Gala³, 2014. Effects of topography and land use on soil characteristics along the toposequence of Ele watershed in southern Ethiopia, CATENA, 115: 47–54**

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**Abstract**: Information on soil properties and distribution is critical for making decisions with regard to crop production and mitigating land degradations. A reasonable way of deriving the information is using proxy environmental characteristics that have demonstrated relationships with soil properties. A field study was conducted to evaluate the relationship between topography, land use and soil properties. Three slope classes were considered and a total of three pedons, one on each slope class, were opened and described at the Ele watershed in southern Ethiopia. Soil samples collected from identified horizons of each pedon were analyzed for physicochemical properties. Additionally, random soil samples were collected from adjacent cultivated, grassland and forest soils; and three composites were made for each land use type within the three slope classes. All three pedons showed remarkable variability in physical, chemical, and morphological characteristics of the soils. The field as well as laboratory textural class determinations revealed the dominance of clay fraction in the soils. The existence of buried horizons with abrupt textural as well as sharp changes in color both in dry and in moist showed the occurrence of lithological discontinuity. Both soil pH and EC were low for steep slope and highest for the middle slope class, whereas the organic carbon (OC), total N (TN) and available P decreased down the slope. Gentle and moderate slope classes had the highest exchangeable bases, while the steep slope had the lowest owing to the removal and deposition of exchangeable bases by water erosion. The chemical properties of the soils were also significantly affected by land use. The highest values of both pH and EC were obtained in cultivated land, whereas grassland had relatively more OC, exchangeable Ca, Mg, K and available micronutrients than the other land use types.

**Key words**: Watershed, Pedon, Physicochemical properties, Land use, Toposequence

**Diriba Geleti¹, Mekonnen Hailemariam², Ashenafi Mengistu² and Adugna Tolera³, 2014. Analysis of fluid milk value chains at two peri-urban sites in western Oromia, Ethiopia: Current status and suggestions on how they might evolve, Global Veterinaria, 12(1): 104-120**

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**Abstract**: The study was conducted to analyze fluid milk value chains at two peri-urban sites in western Ethiopia. The objectives were to determine the characteristics of the dairy farm households, map the fluid milk value chains prevailing in the areas and identify actors involved and their roles and pinpoint value chain constraints and finally suggest interventions required for improving the performance of the value chains. Data on household attributes indicated the majority of the farms to be male headed, with an overall mean of 90%. As to educational status, 50% of them fell in 7-12 grades range, 23% being diploma holders and 10% with BA/BSc degrees and above. A respective 29% and 75% of the respondents at Nekemte and Bako practice crop and livestock mixed farming, with dairying used as source of addition income for the family. The key value chain stages identified were: input supply, production, marketing (distribution), processing and consumption. No formal fluid milk value chains were observed to prevail. Among the key inputs used,
feed was found to be very critical; improved forage production was observed to be low; with farmers depending more on low quality roughages and purchased concentrates. The study also revealed the existence of inefficient breeding and veterinary services. Few private veterinary drug suppliers existed, but they are only limited to veterinary drug vending. Shortage of land was also observed to be one of the factors hindering successful evolution of the value chains at both sites. Women were observed to be highly involved in diverse dairy related activities, mainly milking and milk processing. Both local and cross-bred animals are kept, mean daily milk yield of local breeds being 1.79 lts day 1 at Bako and 1.78 lts day 1 at Nekemte. Daily milk yields of crosses were 6.54 lts day 1 and 9.79 lts day 1 at Bako and Nekemte, respectively. In general, no formal milk marketing system exists in both areas. Generally, productivity of dairy animals was poor at both sites, being attributed to various technical and non-technical factors and potential strategic directions to alleviate the challenges and lead to improvement of the value chains were finally suggested.

Key words: Peri-urban dairy, Value chain, Value chain actors, Technical constraints, Value chain framework, Enabling environment.

*Diriba Geleti¹, Mekonnen Hailemariam², Ashenafi Mengistu² and Adugna Tolera³, 2014. Biomass yield potential and nutritive value of selected Alfalfa (Medicago sativa L.) cultivars grown under tepid to cool sub-moist agro-ecology of Ethiopia, Journal of Agricultural Research and Development 4(1): 007-014

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Abstract: Five alfalfa cultivars (FG10-09 (F), FG9-09 (F), Magna801-FG (F), Magna788 and Hairy Peruvian) were evaluated for forage biomass yield potential and quality at Debre Zeit Agricultural Research Center. The experiment was planted on 4 July 2012 on 12 m² plots, each consisting of 15 rows with intra-row spacing of 0.2m at a seed rate of 20 kg/ha. The plots were laid out in randomized complete block design with four replications, and a starter fertilizer at a rate of 100 kg/ha diammonium phosphate was applied at planting. Significantly higher (P=0.05) herbage dry matter yield was recorded for FG10-09(F), FG9-09(F), Magna788 and Hairy Peruvian, while herbage yield was inferior for Magna801-FG (F). Plant height was higher (P< 0.001) for Hairy Peruvian, medium for FG9-09(F) and Magna801-FG (F), and lower for FG10-09(F) and Magna788. Regarding the leaf to stem ratio, though differences between cultivars were not significant (P> 0.05), Hairy Peruvian had a lower value. Between October 2012 and October 2013, eight cuts were taken at an average interval of 54.6±12.4 days between harvests. Cuts following long and short rainy months gave superior herbage yield values, while those taken during low rainfall months had inferior values (P< 0.001). Crude protein content was higher (P=0.05) for Magna788, FG10-09 (F), FG9-09 (F) and Magna801-FG (F), but lower for Hairy Peruvian. Neutral detergent fiber and acid detergent fiber contents were higher in Hairy Peruvian (P=0.05), with the other cultivars exhibiting consistently low and comparable values for both fractions. In vitro DM digestibility (P=0.05) and relative feed value index (P< 0.001) values were significantly lower for Hairy Peruvian, with the remaining four cultivars exhibiting comparable values for both traits. Cultivars other than Hairy Peruvian exhibited consistently superior crude protein, in vitro DM digestibility and relative feed value index indicating their potential for promotion to advanced varietal evaluation stages and release as better alternatives for use in the farming system.

Key words: Plant height, leaf to stem ratio, chemical composition, crude protein, digestibility Relative Feed Value,


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**Abstract:** In vitro digestibility and in sacco dry matter (DM) degradability of Napier grass/silver leaf Desmodium mixtures were carried out using 3X2 factorial experiment arranged in randomized complete block design with three replications. The treatments were three levels of stubble cutting heights (20 cm, 30 cm, and 40 cm) and two levels of planting patterns (same row and alternate row). For the legume component DM disappearance after 24, 48, 72 and 96 hours of incubation significantly \((p<0.05)\) increased with increasing cutting heights (20 cm to 40 cm) during second year production season. Both factors had no significant effect on DM disappearance and most of degradability characteristics of the grass component during first year, however, in vitro DM digestibility was higher \((p<0.05)\) for alternate than same row planting pattern and increased significantly \((p<0.01)\) with increasing cutting height. During second year, alternate row planting pattern showed higher \((p<0.05)\) DM disappearance after 48, 72 and 96 hours of incubation. Significant difference for DM degradation between cutting heights were observed for 72 and 96 hours of incubation. Among degradability characteristics, slowly fermentable fraction significantly increased \((p<0.05)\) with increasing cutting height. The in vitro DM digestibility of the second season harvest of grass followed similar trend of the first harvest grass component.

**Key words:** Cutting height, Planting patterns, Napier grass, Silver leaf Desmodium, Bako

*Diriba Geleti*\(^1\) and Adugna Tolera\(^2\), 2013. Effect of age of regrowth on yield and herbage quality of Panicum coloratum under sub humid climatic conditions of Ethiopia, African Journal of Agricultural Research, 8(46): 5841-5844

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**Abstract:** The effect of stage of harvest on dry matter (DM) yield and herbage nutritive value of Panicum coloratum under sub humid climatic conditions of Egypt was evaluated. Three harvesting stage treatments (8, 10 and 12 weeks of regrowth age) were assessed. The herbage DM yield \((P<0.05)\); and leaf \((P<0.05)\) and stem component DM yields \((P<0.01)\); and leaf to stem ratio \((P<0.001)\) values were significantly affected by the age of regrowth. Herbage and stem component DM yields; and stand density exhibited an increasing trend with age of regrowth. Mean herbage DM yield ranged from 11.04±0.91tha-1 to 14.71±0.91tha-1. The crude protein (CP) content was 8.28±0.34 and 8.43±0.34% for the 8 and 10 weeks treatments, respectively, while it declined to 6.27±0.34% for samples harvested at 12 weeks of age. Mean values of neutral detergent fibre (NDF) were generally high for all harvesting treatments, the values ranging from 74.02±0.85 to 77.50±0.85%. The in vitro DM digestibility (IVDMD) values ranged from 46.92% for the 12 weeks to 53.65% for the 8 week harvests. The calcium concentration ranged from 0.38±0.05% for the 10 weeks treatment to 0.51±0.05% for that of 10 weeks. Similarly, phosphorus content varied from 0.13±0.005 to 0.15±0.005% and no clear trend was observed with stage of maturity. It was recommended that the grass be harvested at 8 weeks of regrowth age for optimal yield and quality.

**Key words:** Dry matter yield, leaf to stem ratio, crude protein, neutral detergent fibre, in vitro dry matter digestibility, calcium, potassium.

*Diriba Geleti*\(^1\), Mekonnen Hailemariam\(^2\), Ashenafi Mengistu\(^2\) and Adugna Tolera\(^3\), 2013. Nutritive Value of Selected Browse and Herbaceous Forage Legumes Adapted to Medium Altitude Subhumid Areas of Western Oromia, Ethiopia, Global Veterinaria, 11(6): 809-816

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**Abstract:** Seven multipurpose browse legume species (Calliandra calothyrsus, Leucaena Pallida, Cajanus cajan, Gliricidia sepium, Leucaena diversifolia, Leucaena leucocephala and Sesbania sesban), four herbaceous legume species (Lablab purpureus, Stylosanthes guianensis, Desmodium uncinatum and Desmodium intortum), two “noug” (Guizotia abyssinica) cake samples, two cereal straw samples (wheat and “tef” (Eragrostis tef) straws)) and two native grass hay samples collected from medium-altitude sub-humid environment in western Ethiopia were evaluated. The traits recorded were dry matter (DM), ash, crude...
protein (CP), neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL)) and in vitro organic matter digestibility (IVOMD) using near infra-red reflectance spectroscopy method. The mean CP content of the 17 feed samples was 20%, ranging from 3% (wheat straw) to 34% (“noug” cake). The NDF ranged between 29% (“noug” cake) to 80.3% (wheat straw), with a mean of 62%. The IVOMD varied from 38% to 69%, with the former for wheat straw and the latter for both *S. sesban* and *L. pallida*. The ME content (MJ kg 1 DM) ranged from around 4 for wheat straw to 10 for *C. callothyrsus*, with the overall mean of 9 MJ kg 1 DM. Wide differences between feeds was observed for Relative Feed Value (RFV) index, with values ranging from 35.3 (Wheat straw) to 226.5 (“noug” cake). Group-wise analysis of variance revealed “noug” cake to contain significantly (P< 0.001) higher CP (32%), followed by the browse and herbaceous forage legume groups. The CP content of straws (3.4%) and native hays (5.8%) was generally lower (P< 0.001). On the other hand, the NDF content was lower (P< 0.001) for “noug” cake (33%) and higher for straws (78%); and as a group no difference was observed between the browse and herbaceous legumes. The IVOMD was lower for straws (45%) and higher for the herbaceous (67%) and browse legumes (68%). The ME content was lower (P<0.001) for cereal straws (6%), medium for “noug” cake and native grass hays and higher for the browse and herbaceous legumes. Similarly, the RFV index was higher (P< 0.001) for “noug” cake, with comparable values for the other four feed groups. The study generally revealed that cereal straws and native grass hays that are widely used in the present study location mainly as roughage for dairy animals are of inferior quality with high levels of detergent fibers and low levels CP, IVOMD, ME and RFV. On the other hand, “noug” cake and the two forage legume classes are of comparable quality; high levels of CP, IVOMD, ME and RFV and low levels of detergent fiber concentrations. It is concluded that the herbaceous and browse legume species evaluated in the present study can potentially be considered as alternative plant protein supplements to low quality roughage feeds.

**Key word:** Multi-purpose trees, Herbaceous legumes, Cereal straws, Crude protein, Metabolizable energy, Relative feed value

*Diriba Geleti¹, Mekonnen Hailemariam², Ashenafi Mengistu² and Adugna Tolera³, 2013. Herbage Yield and Quality of Selected Accessions of Centrosema Species Grown under Subhumid Climatic Conditions of Western Oromia, Ethiopia, Global Veterinaria, 11(6): 735-741

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**Abstract:** The study was conducted at Bako Agricultural Research Center during main rainy seasons of 2012 and 2013 to identify superior accessions of Centrosema species based on their herbage DM (DMY) and crude protein (CPY) yields and forage quality attributes. Five elite accessions (*C. pubescens* ILRI 233, *C. pubescens* ILRI 243, *C. pubescens* ILRI 12297, *C. plumieri* ILRI 191 and *C. virginianum* ILRI 14541) were evaluated in a randomized complete block design with two replications. The DMY and CPY values were significantly affected by year (P< 0.001) and accession (P = 0.05 for DMY; P< 0.05 for CPY). Significantly higher DMY values were recorded for *C. pubescens* ILRI 233 (7.35 t ha 1) and *C. virginianum* ILRI 14541 (7.10 t ha 1) and *C. plumieri* ILRI 191 (7.35 t ha 1) and *C. virginianum* ILRI 14541 (7.10 t ha 1). The crude protein (CP) content ranged from 18.86% (*C. pubescens* ILRI 243) to 22.37% (*C. virginianum* ILRI 14541), with overall mean of 21.02%. The overall mean neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) values were 49.98%, 35.71% and 9.42%, respectively. The in vitro organic matter digestibility (IVOMD) ranged from 38.62% (*C. pubescens* ILRI 233) to 50.69% (*C. plumieri* ILRI 191). The relative feed value (RFV) varied from 0.001). On the other hand, the NDF content was lower (P< 0.001) for “noug” cake (33%) and higher for straws (78%); and as a group no difference was observed between the browse and herbaceous legumes. The IVOMD was lower for straws (45%) and higher for the herbaceous (67%) and browse legumes (68%). The ME content was lower (P<0.001) for cereal straws (6%), medium for “noug” cake and native grass hays and higher for the browse and herbaceous legumes. Similarly, the RFV index was higher (P< 0.001) for “noug” cake, with comparable values for the other four feed groups. The study generally revealed that cereal straws and native grass hays that are widely used in the present study location mainly as roughage for dairy animals are of inferior quality with high levels of detergent fibers and low levels CP, IVOMD, ME and RFV. On the other hand, “noug” cake and the two forage legume classes are of comparable quality; high levels of CP, IVOMD, ME and RFV and low levels of detergent fiber concentrations. It is concluded that the herbaceous and browse legume species evaluated in the present study can potentially be considered as alternative plant protein supplements to low quality roughage feeds.

**Key words:** Centrosema pubescens, Crude Protein Yield, Digestibility, Relative Feed Value

*Diriba Geleti¹, Mekonnen Hailemariam², Ashenafi Mengistu² and Adugna Tolera³, 2012. Herbage yield, species diversity and quality of native grazing land vegetation under sub-humid climatic conditions of western Ethiopia, Ethiopian Journal of Animal Production, 12: 87-94
Abstract: This survey was undertaken in Mendi district of West Wollega Zone and aimed to identify frequently occurring species, and variation of study sites in terms of herbage dry matter (DM) yield and quality traits. Five sites were sampled to determine botanical composition, herbage yield, species diversity, crude protein (CP), neutral detergent fibre (NDF) and in vitro organic matter digestibility (IVOMD). Overall, 20 species were identified (19 were herbaceous species and one was a dwarf perennial shrub). Out of the 19 species, eight were perennial graminoid, one was an annual graminoid and the rest were annual non-graminoid species. *Hyparrhenia rufa*, *Pennisetum polystachyon* and *Brachiaria humidicola* were observed to be dominant. Location significantly (P< 0.05) affected herbage yield, while intra-location transect position did not (P> 0.05). Mean herbage DM yield values ranged between 0.86±0.39 kg m-2 and for *Guyo Tayiba* site to 3.40±0.39 kg m-2 for *Idoro Tobara* site. Species richness ranged from 3±0.67 to 4±0.67, but between- and within-location values did not vary significantly (P> 0.05). Between-and with-in location differences were not significant (P> 0.05) for diversity. Evenness ranged from 1.21±0.54 to 2.26±0.54. The mean CP, NDF and IVOMD were 6.17±1.27%, 75.89% and 48.44%, respectively. Based on values of species diversity, yield and quality, the studied grassland was found to be poor.

Key words: Evenness, species richness, Shannon diversity index, herbage quality.


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Abstract: The study was conducted with the aim of evaluating three maize varieties (BH-660, BH-540 and Kulani) all released for production in high potential maize zones of Ethiopia by Bako Research Center for grain yield, stover components, digestible crop residue yield and nutritive value of the stover. The analysis of variance revealed that differences between varieties were significant (P< 0.01) for all measured parameters except for the husk fraction (P> 0.05); grain and leaf yields being significantly highest for BH-660. The cob and total residue yields were lowest for BH-540. The values for harvest index were highest for BH-540 (52.74%), intermediate for BH-660 (51.96 %) and lowest for Kulani (45.66 %). Significant varietal differences were observed for ash (P< 0.01), neutral detergent fibre (P< 0.01), acid detergent fibre (P< 0.05), acid detergent lignin (P< 0.05) and in vitro DM digestibility (P< 0.01) values. The present study generally revealed that BH-660 and BH-540 had higher grain yield compared to the variety Kulani. Ranking of the varieties was consistent for harvest index, potential utility index and digestible crop residue yield, the order being BH-540 > BH-660 > Kulani. Consistently similar ranking order was observed for stalk, total residue, CP and CP yield; the ranking being Kulani > BH-660 > BH-540. BH-660 ranked first in grain yield and consistently ranked second for most of the important quality traits. Varieties with higher grain yield were also observed to have higher digestible crop residue yields suggesting the possibility of selecting maize varieties that combine grain yield with desirable residue quality attributes.

Key words: Maize Variety; Nutritive value; grain yield; stover; chemical composition; in vitro DM digestibility


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Abstract: Agricultural systems of Northern Ethiopia are under pressure from demographic expansion leading to land degradation and increasing water scarcity. Livestock water productivity (LWP) is an important component in improving overall productivity in mixed crop-livestock systems. The objective of the study was to characterize the existing farming system in a typical water stressed environment in the Ethiopian highlands in terms of crop and livestock production and to assess LWP at household level. To this end, the characteristic watershed of Lenche Dima watershed was chosen. An exploratory assessment of LWP variables and potential differences between farmers’ wealth classes was conducted based on a survey of 54 sample households and focus group discussions. LWP was determined as the ratio of beneficial outputs over used water. We used market values of livestock products and services to unify the livestock outputs. Water used to produce the livestock outputs was determined based on water consumption to produce the feed. The overall water used per household for livestock production ranged from 3079 ± 2335 (s.d.) m3 per year to 11 975 ± 4080 (s.d.) m3 per year for poor and better-off households, respectively. If fully valued as fuel and fertilizer, manure contributed an overall 34% of the total financial livestock output, followed by draught power (22%), transport (17%) and milk production (16%). LWP ranged from 0.07 to 0.09 US$ m−3 and was not significantly different between farmers’ wealth classes. The small differences were an indication that all farmer types had very limited access to potential LWP improvements through increased feed quality and quantity, improved animal husbandry and better veterinary care.

Key words: Livestock, Water

*Fassill Bekele1,2, Ådnøy T1, Gjøen H.M1, Kathle J.1, Girma Abebe2, 2010. Production performance of dual purpose crosses of two indigenous with two exotic chicken breeds in sub-tropical environment, International Journal of Poultry Science., 9(7): 702-710

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Abstract: An ongoing crossbreeding experiment is being conducted with the objective of producing dual purpose synthetic chicken for village poultry production in Ethiopia. The two exotic chicken breeds used were the Fayoumi (F) and Rhode Island Red (R) as dam line, whereas the two indigenous chicken breeds used were the Naked neck (N) and local Netch (W); a white feathered chicken. The indigenous breeds were used as sire line to produce the hybrids FN (F ♂X N ♀) and RW (R ♂X W ♀). Growth and egg production performance of the crosses were compared with each other and with the exotic pure line performance. Both body and egg weight of FN was improved while body weight of RW was reduced and age at first egg was significantly reduced, compared to their respective dam line. Egg production for the crosses was lower than for their maternal lines. Although FN cross chicks weighed more and grew faster than RW chicks during the brooding period, the difference became insignificant as they grew older. However, the higher overall average body weight gain of RW crosses that was observed was mainly due to higher weight gain for the RW cocks. No significant differences were observed in overall egg production and quality traits between the two crosses, but significant age effect within crosses was found. Mortality in the FN cross was lower than in the RW cross. These F1 crosses will be used as parents to produce a 4-way synthetic crossbred chicken.

Key word: Two-way crossing, egg production, egg quality, body weight


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Abstract: Two indigenous chicken breeds: naked neck (N) and local white (W) feathered chicken called Netch as sire lines and two exotic chicken breeds: Fayoumi (F) and Rhode Island Red (R) as dam lines were
crossed with the objective of producing 4-way cross-bred chicken population, which will later be used as base population to produce synthetic chickens. They were tested under on-station conditions in a college farm and under on-farm conditions at several typical village farms. Mortality during brooding period was lower under on-farm than on-station conditions, which may be owing to housing of the chicks in hay box-brooder on-farm and the coccidiosis infection on-station. However, higher on-farm mortality was observed during the laying period than on-station; mainly because of predation. There was a significant difference between the two systems in recorded body weight from early age to maturity. Age at first egg was lower on-farm than on-station. Average number of eggs produced was not significantly different; although chickens on-station laid more eggs than that on-farm. Hen-housed egg production was lower on-farm than on-station owing to higher mortality in the on-farm system.

**Key words:** Body weight, egg, mortality, reciprocal crossing, village poultry

*Fassill Bekele*\(^1,2\), Hans Magnus Gjøen\(^1\), Jessica Kathle\(^1\), Tormod Ådnøy\(^1\) and Girma Abebe\(^2\), 2009. Genotype X environment interaction in two breeds of chickens kept under two management systems in Southern Ethiopia. *Tropical Animal Production and Health*, 41(7): 1101-1114

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**Abstract:** Rhode Island Red (RIR) and Fayoumi chickens were evaluated on-station in a college farm and on-farm in village farms, whereas local chickens were only tested under on-farm condition. Traits recorded are egg production and egg quality, body weight and feed efficiency at 4, 8 and 12 months of age. Significant age effect was found for most traits except for shell thickness, albumen height and egg length. Also, significant breed by management system interactions were found for all traits measured in both systems. Fayoumi chickens were higher in egg production in both management systems. Moreover, they were higher than RIR in feed efficiency. RIR were higher in most egg quality traits and had higher weight gain. Local chickens performed below the two exotic breeds in most of the traits, but had higher weight gain than Fayoumi. Chickens kept on-farm had poorer performance than those kept on-station in all traits except for yolk colour.

**Key words:** On-station, On-farm, Fayoumi, RIR, Sidancho ecotype, Genotype*environment interaction


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**Abstract:** This paper presents relative proportions of morphological fractions of 20 oats (*Avena sativa* L.) varieties harvested at different growth stages at Holetta, central highlands of Ethiopia. On average the proportion of leaf blade decreased from 52.2 to 15.6% with parallel increase in the proportion of stem from 19.4 to 57.6% as growth advanced from boot stage to grain maturity stage. The average proportion of leaf sheath decreased from 28.4 to 18% as growth advanced from boot stage to the soft dough stage, but it tended to regain at grain maturity stage (26.8%). The panicle proportion was found to be relatively stable increasing only by 4% units with advance in growth from heading to the soft dough stage. The different varieties also exhibited considerable differences with respect to the proportion of morphological fractions over the different growth stages. Taking the physiological maturity for forage harvest of the soft dough stage as a reference, the oats varieties PI – 5800, CI – 8251 and Grayalgeris were found to contain a higher proportion of leaf in their dry matter (DM) than the other varieties, while the oats varieties PI – 244480, SRCP X 80 Ab 2291 and SRCP X 80 Ab 2806 had comparatively higher proportion of stem in their DM. The results showed the presence of considerable varietal differences in the proportion of morphological fractions thereby
suggesting the possibility of improving forage production in oats through proper exploitation of the varietal differences.

**Key words**: Leaf blade, leaf sheath, maturity, panicle, stem


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**Abstract**: Chemical composition and in vitro organic matter digestibility (IVOMD) were measured in whole forage and morphological fractions of 20 varieties of oats (*Avena sativa*) harvested at the soft dough stage. Among the varieties, crude protein (CP) varied from 48 to 76 g kg⁻¹ dry matter (DM), neutral detergent fibre (NDF) from 586 to 683 g kg⁻¹ DM, acid detergent fibre (ADF) from 370 to 482 g kg⁻¹ DM and lignin from 54 to 83 g kg⁻¹ DM. The IVOMD of the whole forage ranged from 43 to 62%. Among the morphological fractions, leaf blades had the highest CP content and IVOMD, whereas the fibre constituents (NDF, ADF and lignin) were highest in the stems. The results revealed considerable variation in chemical composition and IVOMD among the oat varieties and morphological fractions. This implies that there are opportunities for improving forage production and quality from oats through appropriate exploitation of varietal differences. However, manipulation of management practices (such as choice of harvesting stage, use of mixed cropping with compatible legumes and fertiliser application) may still be needed for further improvement.

**Key words**: Oats, varieties, forage, morphological fractions, nutritive value, soft dough stage

Feleke Gebregiorgis¹, Tegene Negesse¹, *Ajebu Nurfeta¹*, 2012. Feed intake and utilization in sheep fed graded levels of dried moringa (*Moringa stenopetala*) leaf as a supplement to Rhodes grass hay, *Tropical Animal Health and Production*, 44: 511-517

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**Abstract**: The effects of feeding graded levels of dried moringa (*Moringa stenopetala*) leaf on intake, body weight gain (BWG), digestibility and nitrogen utilization were studied using male sheep (BW of 13.8±0.12 kg). Six sheep were randomly allocated to each of the four treatment diets: Rhodes grass (*Chloris gayana*) hay offered ad libitum (T1), hay + 150 g moringa leaf (T2), hay + 300 g moringa leaf (T3), hay + 450 g moringa leaf (T4) were offered daily. A 7-day digestibility trial and an 84-day growth experiments were conducted. Dry matter (DM), organic matter (OM) and crude protein (CP) intakes increased (P< 0.05) with increasing levels of moringa leaf in the diets. Sheep fed T2, T3 and T4 diets gained (P< 0.05) 40.2, 79.1 and 110.1 g/head/day, respectively, while the control group (T1) lost weight (~13.3 g/head/day). The apparent digestibilities of DM, OM, neutral detergent fibre and acid detergent fibre were similar (P> 0.05) among treatments. The digestibility of dietary CP increased (P< 0.05) with increasing levels of moringa leaf, but there was no significant difference between T2 and T3 diets. The nitrogen (N) intake and urinary N excretion increased (P< 0.05) with increasing levels of moringa leaf. The N retention was highest (P< 0.05) for 450 g moringa leaf supplementation. The control group was in a negative N balance. Supplementing a basal diet of Rhodes grass hay with dried moringa leaves improved DM intake, BWG and N retention. It is concluded that M. stenopetala can serve as a protein supplement to low-quality grass during the dry season under smallholder sheep production system.

**Key words**: *Moringa stenopetala*, Supplementation, Intake, Nutrient utilization, Sheep

Abstract: This study was undertaken with the objectives of evaluating the effect of dried and ground Vernonia (V. amygdalina) leaves and feed sorghum (S. bicolor) grain mixture supplementation on feed intake, digestibility, body weight change, feed conversion efficiency of Horro lambs fed a basal diet of natural pasture hay. The feeding and digestibility trials were conducted using twenty male lambs of similar yearly age and average body weight of 15.4 ± 0.58 kg. The lambs were blocked into five blocks of four animals each based on their initial body weight and randomly allocated to four dietary treatments from each block giving five animals per treatment. Treatment 1 was fed on grass hay alone, while treatments 2, 3, and 4 received graded levels (150, 300 and 450 g respectively) of a mixture of dried and ground Vernonia leaves and ground sorghum grain mixture as supplements to the grass hay basal diet. Supplementation with dried Vernonia leaves and sorghum grain mixture improved feed intake, nutrient digestibility and body weight gain of the lambs as compared to the unsupplemented animals. The body weight gain of the lambs was lowest in T1 (7.6 g/day), intermediate in T2 (40 g/day) and highest in T3 (81.3 g/day) and T4 (93.8 g/day) (P<0.01). It was concluded that supplementation of Vernon leaves and sorghum grain mixture improved feed intake and digestibility of the diet and body weight gain of the lambs. In general increased performance was observed with increasing level of supplementation. However, cost-benefit analysis is required to determine the optimum level of supplementation, particularly as the level of supplementation exceeds 300 g.

Key words: Lambs, Vernonia, Feed intake, Digestibility, Body weight change


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Abstract: A survey was conducted in Bure district, North West Ethiopia, from 2007 to 2008 to assess the existing village chicken production system. A participatory rural appraisal and a formal survey were used to collect all the relevant data, using a multi-stage sampling technique. Seven farmer administrative kebeles (two from high land, three from mid altitude and two from low land agro-ecologies) and a total of 280 village chicken owner households were considered for the study. The result revealed that the dominant (83%) chicken production system was an extensive/traditional type of production, using a majority (97%) of local chicken ecotypes, managed mainly on scavenging with seasonal supplementation of home grown grains and household food leftovers. The purposes of chicken production were sale for income (51.4%), egg hatching for replacement (45%), consumption (44.3%), use of birds for cultural and/or religious ceremonies (36.4%) and egg production (40.7%). The average flock size per household was 13 (ranged 1-57), with a hen to cock ratio of 3.7:1. Only 22.1% of chicken owners prepared a separate overnight house for birds and the rest (77.9%) kept birds in various night sheltering places. The result revealed that 97.5% of interviewed chicken owners experienced chicken disease problems, mainly Newcastle disease (98.2%). The result indicated that 95% of village chicken owners used only traditional means to treat sick birds. The average age of cockerels at first mating and pullets at first egg were 24.6 weeks and 27.5 weeks, respectively. The average number of eggs laid/clutch was 16 (ranged 8-28) and the number of total clutch periods/hen/year was 4 (ranged 2-6). The annual egg production performance of local hens, under farmer’s management condition, was 60 eggs/hen (ranged 24-112). The average number of eggs incubated/hen was 13 and 11 chicks, on average, were hatched from them. The average hatchability performance of local hens was 81.7%. However, survivability of young chicks was only 60.5% (ranged 0 - 100%). High hatchability performance of local hens (81.7%) and high mortality of young chicks (39.5%) were the two contradictory features for the existing village chicken production system of the district. Seasonal diseases outbreaks (84.3%) and predation (11.4%) were the major causes of chicken loss in the district. Women were the major responsible members of the household involved in various chicken husbandry activities like cleaning bird’s house (38.6%), feeding birds (81.7%), selling birds (83%) and selling eggs (54.6%). Only 37.5% of interviewed chicken owners got appropriate extension services related to modern chicken management practices. The result of the
study revealed that there is a great interest to boost up the existing village chicken production and productivity. This should be considered as an opportunity and potential to design and implement interventions, aimed at improving production and productivity of village chicken in the district.

**Key words:** Ethiopia, local chicken ecotypes, village chicken production system.


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**Abstract:** A repeated and cross-sectional survey together with egg quality analysis was conducted in seven selected farmer’s kebele of Bure district, North West Ethiopia. The major objective of the study was to assess the prevailing handling, storage and quality of local/scavenging hen eggs in the district. A formal survey with structured questionnaire was used to collect all the relevant data, using a multi-stage sampling technique (purposive and random). Seven farmer kebelo (2 from highland, 3 from mid-altitude and 2 from lowland agro-ecologies) and a total of 280 village chicken owner households were considered for the study. In addition 1000 local hen eggs were collected in all seasons and egg sources (markets and producer) and used for the study. Internal and external egg quality traits including: egg shell color, egg length (EL), egg width (EWd), shape index (SI), shell weight (EW), shell thickness (ST), Albumen height (AH), yolk height (YH) and Hough units (HU) were measured. The results indicated that 71.4% of village chicken owners stored eggs inside earthen material (clay) together with grains or straws. The majority of village chicken owners (69.3%) of the study district were involved in selling of eggs. Selling of eggs was done in various places including: urban markets, local markets and farm gates. Women and children (43.2%) were the most important members of the household that were involved in marketing of eggs in the district. Large proportion of the chicken owners (66.4%) use hand carrying to transport eggs to markets. Plastic containers (festal) and grass made bags (locally called ‘kofeda’) were used. The average egg weight was 43g (ranged 34-60g). The mean egg width and egg length measurements were 37.2mm and 50.8mm, respectively. Thus, the average shape index percentage was calculated and found to be 73.2%. The average albumen height and yolk height were 4.1mm and 15.1mm, respectively. The mean Hough unit was calculated using albumen height and egg weight and found to be 66.5 (ranged 36-4-84.8). The average egg shell thickness measurements for sharp region, equatorial region and blunt regions were 0.27mm, 0.26mm and 0.24mm, respectively. Hence the average egg shell thickness was found to be 0.26 mm. It was generally noted that local hen eggs collected from Bure district were poor in quality as compared to the quality of eggs collected from intensively managed local hens. And this indicated that the quality of local hen egg’s of the district could be partially improved by chicken management interventions such as; proper housing, feeding, health care and good handling of eggs.

**Key words:** Local chicken’s ecotypes, scavenging, internal and external egg quality traits, phenotypic correlation.


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**Abstract:** Biophysical attributes of environmentally degraded landscapes in Adwa district, northern Ethiopia, were evaluated using LANDSAT ETM data and GIS. Satellite remote sensing (RS) has captured the spatial distribution and variability of Adwa land covers (75% classification accuracy, 73% Kappa statistic). GIS-based analysis of degraded land’s biophysical attributes has revealed associations between land-cover types, landform elements and major soils groups in the district. Agricultural farms were located
closer to human settlements, while woodlands furthest away from settlements. Moreover, wooded croplands were found between arable and woodlands, indicating encroaching human activities through agricultural expansion. Forests and woodlands were dominant on high mountains, steep slopes and depressions, while degraded shrublands and scrublands were prominent on Leptosols and on dissected uplands and hills. On the other hand, agriculture was prominent on rolling hills and uplands, concave-shaped foot-slopes, and on the soils of the district characterized as Fluvisols and Vertisols. This study provides base-line information and adds to land cover knowledge for this and similar regions. Additionally, it has identified associations among biophysical attributes in degraded Ethiopian highlands have important management implications for both under-developed and over-utilized areas.

**Key words:** Land cover, land degradation, soil erosion, land rehabilitation, deforestation, Ethiopian highlands

*Getahun Legesse*¹,², Marianna Siegmund-Schultze¹, Girma Abebe¹, Anne Valle Zárate¹, 2010. Economic performance of small ruminants in mixed-farming systems of Southern Ethiopia. *Tropical Animal Health and Production*, 42(7): 1531-1539

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**Abstract:** This study evaluates the household income contribution and the profitability of traditional small ruminant enterprises in two mixed-farming systems of southern Ethiopia (viz., Adilo and Kofele). Small ruminant production is an integral part of mixed systems in the Ethiopian highlands. The assessment of the current economic performance of small ruminants indicates production-related opportunities and constraints and provides baseline data against which the success of future interventions can be measured. Detailed information on economic parameters was gathered through a 1-year period of flock and household monitoring (155 households) between September 2005 and August 2006. Structured surveys were conducted with the participating households to elicit information on income-expense details of small ruminant and other agricultural enterprises. Small ruminants contributed considerably to cash income and to a limited extent to human nutrition especially when other sources were in short supply. The annual profit per animal ranged from 20 to 37 Ethiopian Birr. The return to capital was 17% in Kofele and 29% in Adilo, with both values vastly exceeding the national interest rate. The sale of small ruminants contributed to 39% and 23% of total farm cash income among small ruminant keepers in Adilo and Kofele, respectively. Sale prices are highest before holidays. Researches should target at how to use available feed resources in a timely and cost-effective fashion to make use of the seasonal market opportunities.

**Key words:** Economic performance, Enterprise budgeting, Ethiopia, Marketing, Mixed farming, Small ruminants

*Getahun Legesse*², Abebe G¹, Siegmund-Schultze M² and Valle Zárate A², 2008. Small Ruminant production in two mixed-farming systems of Southern Ethiopia: Status and prospects for improvement, *Experimental Agriculture*, 44(3): 399-412

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**Abstract:** Small ruminants are an integral part of mixed-farming systems throughout southern Ethiopia. Yet, they have received little research attention or institutional support. Characterizing the existing small ruminant production systems and analysing their production constraints are important tools to diagnose the status and trends of the systems, and thus to identify areas for future interventions. A survey was conducted between April and July 2004 in the Adilo and Kofele areas of the southern mixed-farming systems of Ethiopia to explore reasons for keeping small ruminants and to evaluate the existing status of and the prospects for the small ruminant sector. Additional information was obtained during discussions with key
informants who had experience of small ruminant keeping. Small ruminants fill several roles in the study area. However, the principal purpose of keeping sheep and goats was to generate cash income. Sheep milk consumption was widespread around Kofele unlike most agricultural systems in the country. Nearly all respondents in Adilo reported fattening their sheep before sale, while such a practice was uncommon in Kofele. Informal insurance schemes were evolving among the sheep keepers in Adilo, and these can be considered as entry points for future interventions. The common problem identified from both individual interviews and group discussions was feed shortage. The identification of alternative feed resources and strategic feeding management might be options for development. Small ruminant disease was the major constraint in Kofele, where marshy areas are increasingly assigned for grazing in the rainy season as suitable land is more and more used for cropping. The growing demand for meat from small ruminants, the improving transportation infrastructure and the experience of farmers in small ruminant keeping are providing opportunities to enhance the contribution of the sector. A thorough monitoring of the productive and economic performance of small ruminants is required to capture the full picture of their contribution thereby directing possible intervention areas to maximize benefits to the farmers.

*Gumataw K. Abebe¹,2, Jos Bijman¹, Ron Kemp¹, Onno Omta¹ and Admasu Tsegaye³, 2013. Contract farming configuration: smallholders preferences for contract design attributes, Food Policy, 40: 14-24

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Abstract: Contract Farming (CF) can enhance smallholders’ income in developing countries. However, empirical research on motivation of smallholders to participate in CF is scarce. This paper explores farmer preferences for particular contract design attributes. We combined analytical hierarchical process and discrete choice experiments to investigate the importance of contract design attributes. On the basis of data collected among potato farmers in Ethiopia, we found that input market uncertainty is more important than output market uncertainty in smallholders’ decision to participate in CF. They tend to minimize this risk by opting for the buyer firm above the state and NGO as providers of seed, inputs, and technical assistance. The results imply that the attractiveness of a CF scheme depends on the willingness of the firm to incorporate the preferred contract design attributes. Institutional intervention in the input market could induce agribusiness firms to offer attractive contracts for smallholders.

Key words: Contract farming; Contract design; Conditional logit; Potato; Ethiopia

*Gumataw K. Abebe¹,2, Jos Bijman¹, Stefano Pascucci¹ and Onno Omta¹, 2013. Adoption of improved potato varieties in Ethiopia: the role of agricultural knowledge and innovation system and smallholder farmers’ quality assessment, Agricultural Systems, 122: 22-32

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Abstract: Although potato is considered to be one of the strategic crops for ensuring food security in Ethiopia, the adoption of high yielding and disease tolerant improved potato varieties is low. Common explanations include farmers’ attitudes to risk and socio-cultural factors. We develop a system perspective that explores farmers’ decisions about adopting improved varieties (IVs) in relation to (1) their engagement with the agricultural knowledge and innovation system (AKIS) and (2) their preferences for local varieties (LVs). On the basis of original data from 346 ware Ethiopian potato farmers we show that the frequency of use of technical assistance from NGOs and access to credit positively affect the adoption of IVs while the use of the main buyer as a source of advice negatively affects IV adoption. We found that farmers have a preference for LVs because of the perceived easier crop management and better stew quality attributes. Yield, disease resistance, and maturity period are less important attributes. Higher education of the household head and the presence of a radio and/or television also have a positive effect on adoption. As to the scale of adoption, we found that only the percentage of owned land, tuber size (of ware potatoes), access.
to credit, stew quality, and presence of a mobile phone have an impact on ware potato farmers’ decision on the amount of land to be used for growing IVs. These results imply that improved production-related quality attributes may not be enough to induce ware potato farmers to adopt new varieties. IVs with relatively low scores on production-related criteria continue to be appreciated by farmers due to demands from their customers. We recommend putting more emphasis on market-related quality attributes in new variety development.

**Key words**: Adoption; Variety development; Innovation; Potato; Quality


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**Abstract**: The objectives of this study were to assess hygienic condition of raw milk at different sampling points throughout the value chain. A total of 132 randomly selected milk producing households (HH’s) were interviewed for the survey based study. A total of 78 raw milk samples were also aseptically collected and tested between January 2009 to July 2010 for microbial analysis. Average counts of aerobic mesophilic bacteria (AMBC), coliform count (CC) and yeast and mould count (YMC) for milk sampled directly from the udder were 4.57, 2.47 and 3.03 log₁₀ cfu mL⁻¹, respectively. The values for samples collected from storage containers at farm gate were 7.28, 4.93 and 5.44 log₁₀ cfu mL⁻¹ for AMBC, CC and YMC, respectively. The microbial count for samples collected from selling points upon arrival were 10.28, 6.52 and 7.13 log₁₀ cfu mL⁻¹ for AMBC, CC, and YMC, respectively. The results obtained from the udder, storage containers at farm gate, selling points upon arrival at distribution shops samples were showed significant difference (p<0.05). The results of the current study indicates that the milk produced and distributed in the study area can be considered as of substandard quality and the consumption of unpasteurized milk may present an important public health risk.

**Key words**: Raw milk, bacterial count, microbiological quality, Hawassa, Ethiopia.


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**Abstract**: The objectives of this study were to understand the production potential, challenges and opportunities in Hawassa. A total of 132 randomly selected milk producing households (HH’s) were interviewed. Dairy cattle in Hawassa city were mainly reared for commercial milk production. 87.5, 79.8 and 60% of large, medium and small size dairy farms, respectively, produced cow milk for sale. The main feed items available in Hawassa city are crop residues, including stover, grass hay, industrial by-products and to some extent Attela – a by-product of a local alcoholic beverage. Deep wells, tap water and rarely, the Lake Hawassa and accessible rivers are drinking water sources for their animals. The average daily milk yield at household level was estimated to be 13.3, 51.5 and 81.4 liters (L) HH⁻¹ for the small, medium and large size farms, respectively with an average being 20.31 L HH⁻¹. Shortage of animal feeds (26%) is the most important limiting factor of dairy production followed by limited space (23%), and animal disease incidence (18%). Therefore, empowering the urban dairy producers by addressing the hampering problems, are helpful to improve production and increase the income of the producers as well as to fulfill the wide range of dairy product demand in the urban areas.
Key words: Urban dairy, farm size, challenges, opportunities, Hawassa, Ethiopia.


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Abstract: Focus on agricultural development in Ethiopia has seen a shift towards the smallholder sector, which is home and employment provider to more than 85 percent of the population. However, the viability status of enterprises within this sector remain largely un-probed research area on-the-ground. This article, which is based on case study of dairy farm at Awassa College of Agriculture, presents results of an economic analysis of the real state, constraints and opportunities vis à vis the performance of the Colleges’ dairy farm for the past five years. Through a Gross Margin Analysis at farm level, the study established that the dairy farm is economically quite viable. Gross margins ranging from Birr 3,589 to Birr 77,920 were obtained in the years considered. However, given the higher genetic potential of the dairy animals and unsatisfied demand for milk in the market, the performance is much less than desired. The cost of production of milk per liter ranging from Birr 1.29 to 1.98 as compared to the selling price of Birr 2 showed a very sensitive profit margin. Feed expense, which accounts for about 90 % of the total expenses, is a major expense of the dairy farm. Identified constraints to production include poor infrastructure, bad sanitary condition, and lack of organized record system, bureaucratic bottlenecks, low quality feeds and inefficient purchasing system. Established opportunities for improvement include enhancing housing and sanitary conditions, timely harvesting and better storage of home-grown feeds, following a planned purchasing and selling systems, use of a well-organized record systems, as well as aiming at economic and efficient production in order to achieve sustained production and economic performance. It is recommended that the farm may be liberalized from bulky bureaucratic purchasing procedures of the University.

Key words: Awassa College of Agriculture, Dairy Farm, Economics, Ethiopia


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Abstract: The study pertains to carcass traits of Arsi-Bale sheep and goats of <1 year and > 1 year but < 2 years reared by the small holder farmers in Southern region of Ethiopia. The results indicate that the average body weight of the slaughtered animals were lower than those reported earlier by several authors. The average weight of the skin, liver, lungs, kidneys for both Arsi-Bale sheep and goat are comparable to the earlier reported works on tropical sheep and goat breeds. The average dressing percentage for sheep varied between 43.7 and 45.98% while the same varied between 47.9 and 51% for goats. The dressing percentage too was comparable with several sheep and goat breeds raised in Ethiopia. It can be concluded that Arsi Bale sheep and goats are potential breeds which can be improved for mutton and chevon production if they are provided with better nutrition and management.

Key words: Arsi-Bale Sheep Goats Carcass traits


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Abstract: The effect of long-term, moderate heat stress (30 to 32 °C) on heat shock protein 70 (Hsp70) concentration in mononuclear blood cells and plasma concentrations of 3,5,3′-triiodothyronine (T3) and corticosterone in laying hens was investigated. 2. Three groups of 48 hens each (Ethopian line [Angete Melata, Na], New Hampshire [NH], F1 cross [Na_NH]) were divided into an experimental group (24 each) and a control group (24 each, ambient temperature 18 to 20 °C), respectively. All hens were kept in individual cages up to an age of 68 weeks and performance data were recorded. 3. Blood samples were taken from the wing vein of 12 hens from each group at weeks 22, 38, 51 and 65 (12 hens x 3 lines x 2 treatments). Mononuclear blood cells were isolated and Hsp70 concentrations were determined by Western Blot analysis with a monoclonal anti-Hsp70 antibody. T3 and corticosterone were measured with commercially available ELISA and RIA kits, respectively. 4. The moderate heat stress caused significantly increased Hsp70 levels compared with the control groups in weeks 51 and 65. However, the responses of the lines were not uniform at different ages. 5. In contrast, T3 levels were significantly decreased in stressed birds regardless of line and age. There was no effect of treatment and line on corticosterone levels during the experimental period. 6. Our results indicate that Hsp70 and T3 levels are affected by mild heat stress applied over a long period but are both involved in independent mechanisms of acquisition of thermotolerance. Further investigations are necessary to clarify whether the observed differences in Hsp70 response between the genotypes are indicators for differences in thermotolerance.


Abstract: The experiment was conducted at Dilla Agricultural Technical Vocational Education and Training (ATVET) College in Ethiopia using twenty-four yearling intact male Sidama goats with a mean body weight (BW) of 16.8 ± 1.14 kg (mean ± SD). The objective of the experiment was to examine the effect of different levels of cottonseed meal (CSM) supplementation on the feed intake, digestibility, BW gain, and carcass parameters of Sidama goats. The experiment consisted of 90 days of feeding trial and 10 days of digestibility trial followed by evaluation of carcass parameters at the end of the experiment. The treatments included ad libitum feeding of hay (T1, control) and daily supplementation of CSM at 200 g (T2), 300 g (T3) and 400 g (T4) per head on dry matter (DM) basis. The experimental design was a completely randomized block design. The experimental goats were blocked on initial BW and six goats were randomly assigned to each treatment. Hay DM, crude protein (CP) and neutral detergent fiber (NDF) intake were higher (P < 0.001) in the non-supplemented than in the supplemented goats, however, the contrary was true for total CP intake. Total DM intake was higher (P < 0.001) for goats supplemented with the high level of CSM than those on the control treatment. Among CSM supplemented goats, the intake of CSM DM, CP, NDF (P < 0.001) and total CP (P < 0.01) were higher in the order of T4 > T3 > T2. The high level of supplementation with CSM resulted in better (P < 0.05) apparent digestibility coefficient (DC) of DM and organic matter (OM) compared to the non-supplemented goats. The apparent DC of CP was higher (P < 0.01) for supplemented than non-supplemented goats. The non-supplemented goats had lower daily BW gain, empty BW, dressing percentage on slaughter weight base, rib-eye muscle area (P < 0.01), BW change (P < 0.001), final BW (P < 0.05) and higher feed conversion ratio (P < 0.01) than the supplemented ones. The medium level of supplementation resulted in higher daily BW gain (P < 0.01), BW change (P < 0.001), final BW (P < 0.05) and lower feed conversion ratio (P < 0.01) than the lower level of supplementation, but with no differences (P > 0.05) in these parameters with the high level of supplementation. Therefore, it is concluded that supplementation of CSM at 300 g DM per head per day resulted in better animal performance parameters in Sidama goats.

Key words: Feed intake, Digestibility, Body weight, Cottonseed meal, Sidama goats

Mekonnen Tilahun1, Kebede Kefelegn2, Girma Abebe3 and *Arthur Louis Goetsch4, 2014. Feed intake, digestibility, weight gain, and slaughter characteristics influenced by genetic percentage of
Boer in goats and Dorper in sheep in the central highlands of Ethiopia, Tropical Animal health and Production, 46(4): 593-602

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Abstract: The objective of this experiment was to compare the feed intake, digestibility, growth performance, and slaughter characteristics of local genotypes of small ruminants in the central highlands of Ethiopia with Boer goat (B) and Dorper sheep (D) blood levels of 0 %, 25 %, and 50 %. Male goats (27; 6–9 months of age) and sheep (27; 3–5 months) were housed individually in confinement during 90-day experiments. Grass hay (6 % crude protein and 64 % or 67 % neutral detergent fiber) was consumed ad libitum together with concentrate (46 % noug seed cake, 28 % wheat bran, 24 % sorghum grain, and 2 % salt) supplemented at 2 % of their body weight. Initial body weight was 18.1, 20.8, and 24.9 kg for Local, 25 % B, and 50 % B, respectively, and 14.8, 20.3, and 17.9 kg for Local, 25 % D, and 50 % D, respectively. Total dry matter (DM) intake by goats ranked Local < 25 % B < 50 % B, and hay intake was greatest for 50 % B. Intake of hay and total DM by sheep ranked Local < 50 % D < 25 % D. Average daily gain by goats was greatest for 50 % B and by sheep was least for Local. Empty body weight of goats at slaughter and carcass weights ranked Local < 25 % B < 50 % B. Body and carcass weights of sheep were lowest for Local. In addition to the difference between 25 % B and Local goats, these results clearly show potential for greater meat yield with the 50 % than 25 % level of B. The findings also depict considerable opportunity to increase meat production by crossbreeding with D, although greater benefit was not realized with 50 % than 25 % D.

Key words: Goat, Sheep, Growth, Carcass

*Melaku S1. and Betsha S2., 2008. Bodyweight and carcass characteristics of Somali goats fed hay supplemented with graded levels of peanut cake and wheat bran mixture, Tropical Animal Health and Production, 40(7): 553-60

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Abstract: The experiment was conducted for ninety days of feeding trial at Haramaya University, Ethiopia using twenty four yearling male Somali goats weighing 20.4 +/- 2.02 (mean +/- SD) with the objectives to evaluate the effect of supplementation of peanut cake and wheat bran mixture (3:1 on body weight (BW) gain and carcass characteristics of Somali goats. The experiment was arranged with six blocks and four treatments in a randomized complete block design. The treatments were ad libitum feeding of hay (T1, control) and supplementation with 200 g (T2), 300 g (T3) and 400 g (T4) peanut cake and wheat bran mixture on dry matter (DM) basis. Supplementation reduced (P< 0.001) hay DM intake, but increased (P < 0.001) total DM intake at 300 g DM (T3) and 400 g DM (T4) level of supplementation compared to the control treatment. Daily BW gain, final BW, empty BW, hot carcass weight and dressing percent were higher (P< 0.001) in the supplemented treatments. Goats on the medium (T3) level of supplementation had significantly heavier (P< 0.001) liver and more muscle deposition, whereas those on hay alone (T1) exhibited heavier bone, head as well as gut contents (P< 0.05). It was concluded that supplementation of Somali goats with the different levels of peanut cake and wheat bran mixture promoted BW gain, dressing percentage and increased the proportion of edible offals. Similarity between the different levels of supplementation used in this study with regard to BW and carcass characteristics favours the use of the low (T2) or medium (T3) level than the high (T4) level of supplementation.

Key words: Carcass parameters,Body weight,Peanut cake,Somali goats,Supplementation,Wheat bran

*Melkamu Bezabih1,2, Pellikaan W.F1,2, Adugan Tolera2, Khan N.A1, and Hendriks W.H1,3, 2013. Chemical composition and in vitro total gas and methane production of forage species from the Mid Rift Valley grasslands of Ethiopia, Grassa and forage Science, 69(4): 635-643

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Abstract: There is increasing interest in sustainable land use in the tropics to optimize animal production while also reducing methane (CH$_4$) emissions, but information on nutritive value and CH$_4$-emission potential of tropical forage species is limited. Samples of 24 grasses and five other forages were collected during the main rainy season on randomly positioned quadrats in semi-arid grassland in the Mid Rift Valley of Ethiopia. Samples were pooled by species, analysed for chemical composition and incubated with rumen fluid to determine total gas and CH$_4$-emission potentials using a fully automated in vitro gas production apparatus. Organic matter digestibility (OMD) and metabolizable energy (ME) contents were calculated from chemical composition and gas production data. Large variability was observed among forages for all nutritional variables considered. The grasses *Eleusine multiflora*, *Pennisetum stramineum*, *Dactyloctenium aegyptium*, *Eragrostis aspera*, *Cenchrus ciliaris* and *Eragrostis cilianensis* showed relatively high OMD (68–72%) and ME values (9·1–10·2 MJ kg$^{-1}$ dry matter). *Melinis repens*, *E. multiflora* and the non-legume forb *Zaleya pentandra* showed relatively low CH$_4$ to total gas ratios; these species may have potential for use in low CH$_4$-emission forage diets. *Acacia tortilis* fruits had high content of crude protein and moderate ME values, and may be an ideal feed supplement for the grazing ruminant. Sodium content was below the recommended level for ruminants in all the forage species. Overall, the pasture stand during the main growing season was evaluated as having moderate nutritional quality.

Key words: nutritive value, grasses, savanna, *Acacia tortilis*, forbs, methane


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Abstract: The seasonal diet composition, digestibility and nutrient in take of cattle grazing on natural pasture in the Mid Rift Valley region of Ethiopia were determined using an improved alkanes method. Sixteen local Borana and Arsi cattle (8 bulls and 8 heifers, 175±10kg weight) were randomly selected from herds at two sites; a moderately grazed ranch and a heavily grazed, communal grassland area. Grazing behaviour was observed and herbage species consumed sampled during five periods (early-dry, dry, short-rainy, main-rainy and end-of-rainy seasons) throughout the year at the two grazing sites. During each period, animals were dosed twice daily with 152±4 mg of C$_{32}$ and 150±3 mg C$_{36}$ alkanes for 10 consecutive days, with faeces samples collected in the morning during the last five days to determine dry matter intake (DMI). The proportion of consumed herbage species in the diet was determined using n-alkanes and their carbon isotope enrichments as markers, while the energy and nutrient in takes were derived from the DMI, digestibility, and diet composition of the DM consumed. Marked seasonal variations (P<0.05) were observed in the species diversity of diets consumed as well as intake of DM (65-98g/kg$^{0.750}$), crude protein (222-448g/d), metabolisable energy (20-37MJ/d) and minerals. Energy intake was more limiting than crude protein for weight gain during most of the seasons. During the dry period, animals were in negative energy and nutrient balance with a predicted body weight loss of approximately 110g/d, whereas in the main rainy season the in takes supported 500-800g daily weight gains. Predicted weight gains agreed well with the body condition recorded for the same period. Then-alkanes method coupled with isotope enrichment in n-alkanes and visual observations as used in the present study provide realistic nutritional data for free-ranging cattle which correlated well with changes in body conditions.

Key Words: Cattle, Diet composition, Grazing, Nutrient intake, n-Alkanes, Abernosa

Abstract: A feeding experiment was conducted to measure the faecal recovery rates of n-alkanes and to evaluate molasses-based alkane boluses for feed intake and digestibility estimations in cattle consuming low-quality tropical roughages. The experiment was performed in a cross-over design with four experimental diets, four 21-day feeding runs and eight bulls. The animals received a measured amount of the experimental quality tropical roughages. The experiment was performed in a cross-over design with four experimental diets that resulted in little refusal throughout the experiment. After seven days of adaptation, the animals were dosed with molasses-based alkane boluses (each containing 200 g C32 and 150 g C36) twice daily at 07:00 and 18:00 h. Concurrent with the alkane dosing, faecal spot samples were taken twice daily until the end of each run. In addition, total faecal collections were performed over the last 5 days of each run. The mean faecal recovery rate of both natural and dosed n-alkanes ranged between 0.61 and 0.86, with the recovery showing an upward trend with increasing carbon-chain length. The recovery rate of dosed alkane was considerably higher than that of adjacent odd-chain alkanes. Whilst diets did not differ (P > 0.23) in the recovery of even-chain n-alkanes, an effect of diet (P ≤ 0.01) was observed in the recovery of odd-chain n-alkanes. The faecal concentration of dosed alkanes reached equilibrium 3.30 days into the alkane dosing. On the assumption of similar faecal recovery of adjacent n-alkanes, intake was underestimated by 12% (P < 0.001) when C31/C33 and C33/C35 alkane pairs were used and by only 1.5% (P > 0.42) when C32/C36 was used. Correction for differences in the faecal recovery of adjacent n-alkanes considerably improved the intake prediction when C31/C33 and C33/C35 pairs were used. Digestibility of diets was accurately predicted using either C36 as external marker or C35 as internal marker corrected for incomplete recovery. The results showed that molasses-based boluses administered twice daily are suitable, and that knowledge of the faecal recovery rates of adjacent n-alkanes improves the reliability of the predictions.

Key words: Ruminant, Intake, Digestibility, Prediction, Grazing, n-Alkane


Abstract: Plant cuticular n-alkanes have been successfully used as markers to estimate diet composition and intake of grazing herbivores. However, additional markers may be required under grazing conditions in botanically diverse vegetation. This study was conducted to describe the n-alkane profiles and the carbon isotope enrichment of n-alkanes of common plant species from the Mid Rift Valley rangelands of Ethiopia, and evaluate their potential use as nutritional markers. A total of 23 plant species were collected and analysed for long-chain n-alkanes ranging from heptacosane to hexatriacontane (C(27) to C(36)), as well as their carbon isotopic ratio ((13)C/(12)C). The analysis was conducted by gas chromatography/combustion isotope ratio mass spectrometry following saponification, extraction and purification. The isotopic composition of the n-alkanes is reported in the delta notation (δ(13)C) relative to the Vienna Pee Dee Belemnite standard. The dominant n-alkanes in the species were C(31) (mean ± s.d., 283 ± 246 mg/kg dry matter) and C(33) (149 ± 98 mg/kg dry matter). The carbon isotopic enrichment of the n-alkanes ranged from -19.37‰ to -37.40‰. Principal component analysis was used to examine interspecies differences based on n-alkane profiles and the carbon isotopic enrichments of individual n-alkanes. Large variability among the pasture species was observed. The first three principal components explained most of the interspecies variances. Comparison of the principal component scores using orthogonal procrustes rotation indicated that about 0.84 of the interspecies variances explained by the two types of data sets were independent of each other, suggesting that the use of a combination of the two markers can improve diet composition estimations.
It was concluded that, while the n-alkane profile of the pasture species remains a useful marker for use in the study region, the δ(13)C values of n-alkanes can provide additional information in discriminating diet components of grazing animals.

**Key words:** n-alkanes, carbon isotope, marker, diet composition, feed intake

**Mengistie Taye**12, **Girma Abebe**2, **Solomon Gizaw**3, **Sisay Lemma**3, **Abebe Mekeya**3 and **Markos Tibbo**15, 2010. Growth performances of Washera sheep under smallholder management systems in Yilmanadensa and Quarit districts, Ethiopia. *Tropical Animal Health and Production, 42:* 659-667

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**Abstract:** A study was conducted to evaluate growth performances of Washera sheep under smallholder production systems in the Yilmanadensa and Quarit districts of the Amhara National Regional State, Ethiopia. Data were collected and analysed on the growth of 690 lambs owned by 110 households from October 2004 to September 2007. Weight (kilograms) of Washera lambs at birth, 1, 3, 6, 9 and 12 months of age was 2.69 ± 0.02, 7.10 ± 0.16, 12.42 ± 0.11, 16.12 ± 0.91, 20.05 ± 0.55 and 23.47 ± 0.68, respectively. Birth weight was significantly (P < 0.05) affected by district, year of birth, parity of the dam, birth type and sex of lamb and by the interaction effect of parity by birth type and parity by sex of lamb. Weaning weight was also affected by year of birth, type of birth and sex of lamb. Yearling weight was affected by only year of birth and sex of birth. The average daily weight gain (ADG; grams) from birth to 30 days, birth to 90 days, 90 to 180 days and birth to 1 year of age was 143.37 ± 13.46, 107.09 ± 2.67, 39.78 ± 9.73 and 60.13 ± 1.89, respectively. Growth rates from birth to 30 and 90 days of age were significantly (P < 0.05) affected by birth year, birth type and sex. ADG from birth to 1 year of age was affected by lamb sex and district. The indigenous Washera sheep had faster growth rate than those sheep breeds of Ethiopia extensively studied thus far. Integrated efforts combining improved nutrition, health and participatory community-based breeding would help the smallholder farmers to utilise and conserve this immense sheep genetic resource of Ethiopia.

**Key words:** Growth traits, Washera breed, Sheep, Smallholder management system, Ethiopia

**Mesfin Kebede**1, **Sheleme Beyene**2 and **Yifru Abera**1, 2012. Modeling the Influence of Floriculture Effluent on Soil Quality and Dry Matter Yield of Wheat on Vertisols at Debre Zeit, Ethiopia. *Journal of Environment and Earth Science, 2*(2): 40-50

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**Abstract:** Floriculture is one of the booming sectors in Ethiopia. With its expansion, there is a growing concern as to its adverse effect on the environment. The objectives of this study were to provide concrete information on the influence of floriculture effluents on soil quality and crop productivity. Two permanent greenhouse experiments were conducted at Debre Zeit Agricultural Research Center on soils samples collected from farmer’s fields using wheat as a test crop. The soil samples were divided into two equal parts as sterilized and non-sterilized. Seven rates of floriculture effluents (0, 15.0, 30.0, 45.0, 60.0, 75.0 and 90.0 ml pot-1) were used as treatment in CRD with four replications. The effluent was characterized by high pH, EC, N, P, S and basic cations (K, Ca, Mg and Na), low in micronutrients (Cu, Fe, Mn and Zn) and very low in heavy metals (Mo, Ni, Cd and Cr). Accordingly, its application did not significantly influence the texture and water holding capacity (WHC) of the soil, though decreasing values of FC, PWP and WHC were obtained both from sterilized and non-sterilized soils. Chemical properties were highly influenced by effluent additions. The pH, EC, exchangeable bases and micronutrients of the soil were significantly raised after first and second harvest. Organic carbon and Total Nitrogen increased with increasing volume of effluent, but decreased at high levels. Shoot dry weight of the wheat was also significantly affected by increasing volume of effluent. In non-sterilized soils, addition of low volume effluent increased shoot dry weight which later
followed the same trends as sterilized soils. The decreasing trend in shoot dry weight was in line with that of soil organic matter, whereas continuous increments in pH, CEC and ESP resulted in changing the neutral soil to saline. Hence, floriculture effluent was found to affect the performance of wheat and soil quality parameters, where the effect was pronounced for sterilized soil. Future research should focus on long-term effects of floriculture effluents on physical, chemical and biological properties of soil and crop productivity.

**Keywords:** Effluents, floriculture, non-sterilized, sterilized, soil quality


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**Summary:** This study describes the on-farm performance of local Kei chicken and its F1 crosses with Fayoumi and Rhode Island Red (RIR) breeds in Beresa watershed of Guraghe administrative zone, southern Ethiopia. The Kei paternal line was mated with maternal lines of Fayoumi and RIR chickens to produce F1-crosses. Body weight developments and feed intake were determined on weekly basis. Then body weight gain and feed efficiency ratios (FER, weight gain: feed) were calculated. Hatchability was 59.0% and 73.7%, 54.7% for Kei, Fayoumi-crosses and RIR-crosses, respectively. In male chicks, the mean day-old weight ranged from 28.8 to 40.1 g and in female chicks from 26.2 to 35.8 g. The average body weight of mature male and female RIR-crosses was 1682 and 1227 g, respectively. The corresponding values for Fayoumi-crosses were 1310 and 1054 g and that of local Kei 1273 and 987 g. During the brooding period, the average daily feed intake was 25.9, 27.0 and 24.4 g for Kei, Fayoumi-crosses and RIR-crosses, respectively. The mean FER was 0.197, 0.213 and 0.243 g for Kei, Fayoumi-crosses and RIR-crosses, respectively. The average age at sexual maturity for Kei, Fayoumi-crosses and RIR-crosses was 183, 154 and 162 days, respectively. The results of the present study suggest that both F1-crosses showed a significant improvement in body weight, weight gain and FER under farmers’ management condition of the watershed areas suggesting the suitability of both genetic combinations with local Kei chickens for on-farm chicken productivity.

**Key words:** Farmers’ management, Growth performance, F1-crosses, Rhode Island Red chicken, Fayoumi chicken, Local Kei chicken


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**Abstract:** This study was conducted to evaluate the crossbreeding effect on egg quality traits of local Kei (a red plumaged chicken) and its F1 crosses with Fayoumi and Rhode Island Red (RIR) chicken breeds under farmers’ management conditions. The local Kei paternal line was mated with maternal line of Fayoumi and RIR to produce F1-crosses. At the same time, local Kei chickens were produced and used as a control group. Twenty-four households were involved in the study who received 10 chicks from each 3 genotypes (total of 720 chicks). Three hay-box brooders fitted with chick-runs were provided to each household in which the three genotypes were reared. Eggs were collected once daily while egg weight was determined on weekly basis. Egg quality traits were evaluated three months after sexual maturity. Egg production was (p< 0.05) higher for F1 crosses than local Kei chickens. Among F1 crosses, the Fayoumi-crosses had (p< 0.05) better egg production potential than RIR-crosses. Moreover, the investigated shell thickness and internal egg quality traits were (p< 0.05) higher in local Kei and Fayoumi-crosses than RIR-crosses. However, eggs from RIR-crosses were (p< 0.05) heavier than Fayoumi-crosses and local Kei chickens. In conclusion, Fayoumi
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chicken breeds could be a viable option to upgrade the general poor performances of indigenous chicken populations through well designed crossbreeding schemes.

Key words: Crossbreeding, egg quality traits, fayoumi chicken breed, F1 crosses, local kei chicken, farmers’ management, Rhode Island Red chicken breed


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Abstract: A study was conducted to evaluate the on-farm performance of Local and its F1 crosses with Fayoumi and Rhode Island Red (RIR) breeds in Beresa watershed of Guraghe administrative zone, southern Ethiopia. The Local paternal line was mated with maternal lines of Fayoumi and RIR chickens to produce F1-crosses. Twenty-four households were involved in the study who received 10 chicks from each 3 genotypes (total of 720 chicks). Three hay-box brooders fitted with chick-runs were provided to each household in which the three genotypes were reared. Body weight and feed intake were determined on weekly basis while weight gain and feed conversion ratios (FCR, feed: gain) were calculated. Hatchability was 59.0% and 73.7%, 54.7% for Local, Fayoumi-crosses and RIR-crosses, respectively. Mean day-old weight in males chicks ranged from 28.8 to 40.1 g; and in females from 26.2 to 35.8 g, the highest and lowest values being for RIR-crosses and Local, respectively. Mean body weight of matured male and female RIR-crosses was 1682 and 1227 g, respectively. The corresponding figures for Fayoumi-crosses were 1310 and 1054 g and that of Local 1273 and 987 g. During the brooding period, the average daily feed intake was 25.9, 27.0 and 24.4 g for Local, Fayoumi-crosses and RIR-crosses, respectively. The mean FCR was 5.08, 4.68 and 4.11 g for Local, Fayoumi-crosses and RIR-crosses, respectively. The respective age at sexual maturity for Local, Fayoumi-crosses and RIR-crosses was 183, 154 and 162 days. The results of the present study suggest that both F1-crosses showed a significant improvement in body weight, weight gain and FCR under farmers’ management condition of the watershed areas.

Key words: On-farm performance evaluation, F1 crosses, RIR, Fayoumi, Local chicken, growth performance, Southern Ethiopia

Mohammed Beyan¹, Martin Gabel² and *Karlsson L.M³⁴, 2013. Nutritive values of the drought tolerant food and fodder crop enset, African Journal of Agricultural Research, 8(20): 2326-2333

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Abstract: Enset (Ensete ventricosum) is a drought tolerant crop, traditionally grown in Ethiopia. It has many usages: food, fodder, fibres and traditional medicine. Being perennial, enset improves local climate and soil conditions. It could contribute to improved food security in several drought-prone parts of the world. The aims of this study were to reveal the amino acids of enset corm, which can be cooked as a root crop, and to increase the general knowledge regarding chemical composition and energy values of different enset fractions. Water content was high, 85 to 90%, which is beneficial when used as fodder during dry periods. Enset corm contained 17 of 20 amino acids and had similar or higher concentration than potato of 12 of these. Leaves had 13% protein, among the highest available in Ethiopia, 20% crude fibre and 10% sugar; a good fodder and suitable for ensilage. The pseudostem, the main food source, was rich in soluble carbohydrates (80%) and starch (65%), but had low protein content (4%). An enset based diet should be supplemented with protein and complementary amino acids; for example from beans, which are suitable to intercrop with enset.
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**Key words:** Amino acids, corm, *Ensete ventricosum*, Ethiopia, Kocho, pseudo stem, root crop


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**Abstract:** In developing countries, where research funds are limited, the availability of pedogenic information and proper classification of soils will be of great importance. The soils of Kindo Koye watershed were fully characterized along east and west facing toposequences that formed a catena and classified according to the Soil Taxonomy and the WRB Legend to assess the impact of topography on soil development and characteristics. The morphological and physiochemical properties of seven pedons located at the upper, middle and lower slopes of the two toposequences and at the depression were studied. The study revealed the existence of three different soil orders along the toposequences in an area that was previously mapped as Eutric Nitosols. The pedons on the upper and middle slopes of both east and west-facing toposequences and the pedon on the east-facing lower slope were categorized under Ultisols, whereas the pedons on the foot slope west-facing and the depression were categorized under Inceptisols and Entisols, respectively. The Ultisols, Inceptisols and Entisols were further categorized as Acrisols, Cambisols and Fluvisols major groups according to the WRB Legend, respectively. This detail survey and classification of soils shows that topography has a great influence on soil development and characteristics.

**Key words:** Catena; Toposequence; Pedon; Soil Taxonomy; WRB Legend


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**Abstract:** A diagnostic survey was carried out in Badawacho and Sodo Zuria districts of Southern Nations, Nationalities and Peoples Regional State (SNNPRS) of Ethiopia. The districts were characterized by mixed crop-livestock production system. The average land holding per household is 1.29 ha in the Badawacho district and 0.58 ha in Sodo Zuria district. Livestock have multiple roles. Households keep cattle mainly as a source of draft power in Sodo Zuria and as source of milk in Badawacho districts. The main purpose of keeping small ruminant was as a source of cash income. The average livestock holding per household was 2.60 and 1.97 TLU in Badawacho and Sodo Zuria districts, respectively. The survey indicated that the main dry season feed resources are crop residues, whereas natural pasture is the main source of feed in the wet season. According to the respondents, feed shortage is the major livestock production constraint in both Badawacho and Sodo Zuria districts. Feeding sweet potato vine to livestock is commonly practiced in both districts, mainly as fresh and also after curing. The bulk of sweet potato vine is obtained during harvesting of sweet potato tubers. Households use a smaller portion of the vine for propagation. But the larger proportion of the residue that is left aside is available for feeding to livestock.

**Key words:** feed resources; sweet potato vine; livestock production constraints; Ethiopia


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**Abstract:** Supplementation with forage legumes could be a sustainable way of improving the feeding value of poor quality crop residues especially to the resource poor African smallholders. Thus, the potential of *Desmodium intortum*, *Macrotyloma axillare* and *Stylosanthes guianensis* in improving the utilization of a basal diet of maize stover by sheep was assessed in a feeding trial. Maize stover used in this experiment was high in lignocellulosic cell-wall constituents and very low in CP. *S. guianensis* hay contained higher CP and
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lower NDF, ADF, and lignin contents than *D. intortum* and *M. axillare* hays. According to animal responses, under the conditions of this experiment, *S. guianensis* was superior to the other two legumes in improving the feeding value to sheep of maize stover based diets. *M. axillare* was found to be inferior. In general, 250 g of *S. guianensis* and 350 g of *D. intortum* hays per day per sheep (18.2 kg Lwt ± 1.2) were found to be optimum levels of supplementation to maize stover. At these levels of supplementation modest levels of bodyweight gain were achieved. It is suggested that the two legumes are useful to bridge the gap in feed supply in areas where livestock depend on poor quality crop residues during the dry season.

**Key words**: Sheep, legume, maize stover, intake, bodyweight

*Sandip Banerjee, 2013. Morphological traits of duck and geese breeds of West Bengal, India, Animal Genetic Resources, 52: 1-16*

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**Abstract**: The study pertains to phenotypic characterization of some breeds of duck (common white duck and Indian runner duck), Muscovy ducks (black and white feathered and sepia feathered) besides two breeds of geese (white and brown feathered and white feathered) reared in the state of West Bengal (India). The study was conducted at five locations of the state and comprised 1395 ducks and 600 geese. The data were analysed statistically using mainly descriptive statistics, the differences in mean were analysed using Duncan’s multiple range test. Both qualitative and quantitative traits were considered in the study. The qualitative traits were shank colour, bill colour, colour of the feathers, skin colour, egg shell colour, the presence or absence of beans, body carriage, bill type and colour of the eyes, while the quantitative traits included in the study were weight of the ducks and weight of the eggs. Some production traits such as numbers of eggs laid per year and dressing percentage of the drakes and ganders of each breed too have been studied. The ducks and geese are raised under semi-intensive management system and mostly depend on scavenging for their nutritional needs. This results in poor egg production and at times loss of stock because of diseases. The study regarding average egg production indicated that the Muscovy ducks and the geese have poor egg production, whereas the Indian runner followed by the common white duck are potentially the best. The ducks are important source of earnings for the small holder farmers and are raised both for meat and eggs, while the geese are reared mostly for ornamental purpose. However, the populations of the ducks are fast dwindling because of avian influenza in the region and because restocking is mostly being carried out with less adapted Khaki Campbell ducks. This happens mainly because the government farms that were responsible for providing the ducklings for restocking maintain Khaki Campbell ducks and do not have the parental stock of the native duck breeds, while restocking of the Muscovy ducks and geese are carried out by the rearers themselves. There are also no prevailing breeding programmes to conserve, select, maintain and distribute the native breeds of duck and geese. Hence, it is of earnest importance to conserve the avian genetic resources before the population dwindles further.

**Key words**: duck, geese, egg production, phenotypic characterization, West Bengal, India


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**Abstract**: The study pertains to estimating the carcass weight and weights of different carcass cuts using non invasive methods (slaughter weight and breast angle prior to slaughter). The results indicate that the accuracy of the breast angle to assess the weights of the neck, thorax, pectoral muscles and liver, are higher than the body weight itself, indicating a significant response to selection between the traits studied and the breast angle. The results for the hind region of the carcass (drumsticks and lumber were better predicted using the slaughter weight. In all the cases the quadratic curve fit equation proved to be the best estimator, except for assessing the weight of the lumber region which was better estimated using the compound, power,
growth, exponential and logistic curve fit equation, however the results are only slightly better than those obtained using the quadratic regression equation.

**Key words**: Khaki Campbell drakes Curve fit regression equations Slaughter traits Eastern India


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**Abstract**: The study pertains to estimation of carcass cuts in Soviet Chinchilla bucks. The results indicate that the slaughter weight significantly influences the weight of the fore legs (P< 0.05) and hind legs (P< 0.01). The quadratic regression equations provide the best estimators for all the carcass cuts and the carcass as a whole. The accuracy of the predictors is highest for

**Key words**: Soviet Chinchilla bucks Regression equations Carcass cuts Eastern India


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**Abstract**: The study pertains to the carcass traits of thirty yearling Sahabadi ewes that were raised under the semi intensive conditions by farmers in Bardhamman district of West Bengal. Sahabadi is one of the least studied sheep and owes its origin to Sahabad district of Bihar. The sheep bears coarse wool and is leggy. The results indicate that the dressing percentage of the ewes were low (39%). The weights of the different edible and non edible offal’s and important carcass cuts too have been described. The results indicate that there is ample scope of improving the carcass traits provided the sheep are well managed and provided proper nutrition and veterinary care.

**Key words**: Sahabadi ewes Carcass traits West bengal India Bardhamman


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**Abstract**: The study pertains to the carcass traits of Khaki Campbell drakes which were reared at a commercial farm in Eastern India. Khaki Campbell is a breed of duck known for superior egg laying capacity. The results indicate that the drakes of the breed can be effectively fattened and used for meat purpose. The average weight of the drakes in the study was 1456. ±172.65 and the dressing percentage were assessed to be 54.7%, which is lower than the values for meat breed of ducks. The values for different carcass cuts too have been tabulated along with that of the different no edible and edible giblets. The correlation studies indicate that most of the traits studied are significantly correlated with carcass weight however non significant yet positive correlation values were obtained between, however negative correlation with most of the traits was estimated with lumber region.

**Key words**: Khaki campbell drakes Eastern india Carcass traits Correlations

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**Abstract:** The present study pertains to estimation of body weight of Vigova Super M, broiler ducks using linear and some non-linear (log, inverse, quadratic, cubic, power, S, compound, logistic, growth and exponential) regression equations. Breast angle was considered as a predictor for estimation of the body weight. The results indicate that quadratic regression equation provided the most accurate estimator. The coefficient of determination values being highest at seven weeks of age and thereafter the values decreased as redistribution of muscles occurred and the growth of the birds decreased.

**Key words:** Vigova, Super M, Curve fit equations, Body weight and breast angle, growth


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**Abstract:** The study pertains to the estimation of carcass traits of broiler duck reared in hot and humid climate of Eastern India. The carcass and different cut weights were estimated using non invasive measurements, breast angle and body weights separately at different ages, i.e. 21, 28, 35, 42, 49 and 56 days of age. The carcass traits were estimated using linear, logarithmic, exponential, inverse, power, quadratic, logistic, compound, growth and sigmoid curve fit equation. The efficiency of the equations derived was estimated using coefficient of determination values. The results indicated that the body weights at all ages were better estimator than the breast angle, which might be attributed to the slow development of the pectoral muscles in ducks. Amongst the curve fit regression equations it can be concluded that the quadratic regression equation provided the best estimator on an overall basis, whereas at many times the sigmoid regression equation was a better estimator than the former.

**Key words:** Broiler duck, Carcass traits, Breast angle, Body weight Curve fit regression equations


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**Abstract:** The study was conducted on Vigova Super M ducks reared for meat. The body weight of the birds was assessed using their breast angle. Breast angle at 21 days was used to predict the body weight at 21, 28, 35, 42, 49 and 56 days. Similarly breast angles at 28, 35, 42, 49 and 56 days were used for prediction of body weight. The data was analyzed using linear, logarithmic, exponential, inverse, power, quadratic, logistic, compound, growth and sigmoid curve fit analysis. The results indicated that the growth of the ducks is different at different phases of life. Quadratic regression analysis has a better prediction (R2) value than the others at most of the times.

**Key words:** Vigova Super M, Linear and non linear regression equations, Body weight and breast angle


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**Abstract:** Tibetan sheep are carpet and apparel wool producing ovine breed of the Indian subcontinent. The Bhotia community of North Eastern India traditionally rears the sheep of this breed. The Tibetan sheep are adapted to the temperate climate and have been providing livelihood for majority of the people in the region. Livestock herding was the primary occupation of the people of the higher altitude regions of the area but it
has been observed that the younger generations are shifting, towards alternative sources of livelihoods. This is leading to reduction in the sheep population in the region. The need for conservation efforts of the Tibetan sheep in India has long been recommended. Les moutons Tibétains sont le tapis et la laine de confection produisant la race ovine du sous-continent Indien. La communauté Bhotia de l'Inde Nord de L'est élève traditionnellement les moutons de cette race. Les moutons Tibétains sont adaptés au climat tempéré et ont fourni des moyens d'existence à la majorité des gens dans la région. Le bétail s'assemblant était l'occupation primaire des gens des plus hautes régions en altitude de la région; il a été remarqué que les générations plus jeunes se déplacent, vers les sources alternatives de moyens d'existence. Cela cause la réduction de la population de moutons dans la région. Le besoin pour les efforts de conservation des moutons Tibétains en Inde était longtemps recommandé.

**Key words**: Tibetan sheep, Wool quality, Sikkim


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**Abstract**: A case history of acute copper toxicity in a flock of Garole sheep has been presented. The animals which suffered from the toxicity were fed solely on leaves of mahogany plant for two days prior to the onset of the symptoms. The soil in the region of West Bengal is deficient in both zinc and molybdenum, which may have caused copper imbalance in the animals. Serum biochemical and postmortem findings of the affected organs too have been presented.

**Key words**: Garole sheep, Copper toxicity, West Bengal


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**Abstract**: Garole is a breed of sheep reared in the Sunderban region of India and Bangladesh. The animals of this breed are adapted to the hot and humid coastal region and are often seen grazing in water. Garole are reared as mutton sheep. The value of their wool is grossly ignored and presently wasted. The raw wool obtained from this breed can be stored for a long time without any significant deterioration in quality, that might be attributed to the genetic tolerance of the breed towards fleece rot. The wool quality parameters of Garole sheep indicate that the wool is coarse but has an excellent felting property. The raisers of these sheep are economically challenged members of the society, and handicrafts produced from the wool can assist in the alleviation of poverty as well as provide an alternative livelihood. An organisation has taken steps in scientific sheep rearing in the region and has assisted in training members of the community in the production of rugs from the wool. The organisation is also providing assistance in marketing the products developed on behalf of the beneficiaries.

**Key words**: Garole sheep, self-help groups, West Bengal, wool

*Sandip Banerjee¹, Galloway S.M², and Davis G.H³, 2011. Distribution of prolific Garole sheep in West Bengal, India. Animal Genetic Resources, 48: 29-35*

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**Abstract**: The Garole is a prolific breed of sheep. High prolificacy in sheep carrying the Booroola gene (FecB) is the result of a mutation in bone morphogenetic protein receptor-IB (BMPR-IB) (Wilson et al., 2001a,b) which had previously been identified in Garole sheep from the Sunderban region of West Bengal (Davis et al., 2002) . There is evidence that the breed has originated from the sheep brought by the Tibetan
traders and traded in the plains of Bengal during the seventeenth till the nineteenth century. The present study was carried out to remap the distribution of the Garole sheep within the state of West Bengal (India) using the presence of the BMPR-IB mutation in the sheep flocks reared at different locations within the state of West Bengal. The breeding tract of Garole sheep was initially thought to be in the districts of 24 Parganas, South and North alone. However, the results from the present study indicate that the sheep is also reared in the district of Midnapur (East), besides in Jalpaiguri and Cooch Behar districts situated in northern parts of the state. The results of the present study indicate that the breeding tract of Garole sheep extends up to Jalpaiguri and Cooch Behar districts of West Bengal at 26°16’ and 27°0’ North latitude and 88°4’ and 89°53’ East longitude. This study also indicates that the ancestors of the Garole sheep have migrated from China/Tibet, during the trading between West Bengal and Bangladesh during the seventeenth century till the early twentieth century.

Key words: Garole sheep, FecB mutation, distribution, West Bengal, India

Sandip Banerjee¹, *Aberra Melesse¹,³, Eshetu Dotamo², Kefyalew Berihun¹ and Mohammed Beyan¹, 2013. Effect of Feeding Different Dietary Protein Levels with Iso-Caloric Ration on Nutrients Intake and Growth Performances of Dual Purpose Koekoeck Chicken Breeds, International Journal of Applied Poultry Research, 2(2): 27-32

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Abstract: The study was conducted to investigate the effect of feeding different levels of crude protein (CP) but similar levels of energy on nutrients intake and growth performance traits of Koekoeck chickens. Two hundred chicks irrespective of their sexes were randomly assigned to 4 treatment diets (T) containing 16% CP (T1), 18% CP (T2), 20% CP (T3) and 22% CP (T4). Each treatment groups were replicated 4 times with ten chicks per replicate. The feed (offered and refusal) was measured using a digital balance every morning before offering the daily feed. The body weight was assessed on a weekly basis. The results indicated that there was a significant (P< 0.05) increase in feed consumption as the level of protein increased in the diet. The dry matter intake was (P< 0.05) higher for chickens receiving T3 and T4 diets. The overall feed consumption was higher among the chickens receiving T3 and T4 diets, while it was the lowest among those receiving T1 diet. The result also indicated that the intake of protein was (P< 0.05) different and positively associated with the intake of CP. The intake of calcium was higher for chicks fed on T2 diet as compared to those receiving T3 diet. Chickens receiving T1 diet had a significantly lower energy intake when compared to those reared on T4 diet. Whereas chickens reared on diets containing T2 and T3 diets had intermediate value between the two. The results indicated that by increasing in the level of protein in the diets did not influence the overall body weight gain and final live weight of chickens. Though not significantly, the chickens reared on diets containing higher levels of protein (T4) showed poor growth performance, this may be attributed to differences in energy protein ratio among the diets. The Koekoeck chickens reached the highest growth rate at 9th week and followed by 11th and 13th week of the experimental periods. The feed conversion ratio (FCR) improved numerically with increasing levels of protein in the diet. From the current work it can be concluded that 16% dietary CP is optimum for Koekoeck chickens.

Key words: Crude protein levels; feed conversion efficiency; feed intake; growth performances; Koekoeck chickens

*Sandip Banerjee¹, Kassa Demo² and Aster Abebe¹, 2013. Some Serum Biochemical and Carcass Traits of Arsi Bale Rams Reared on Graded Levels of Millettia ferruginea Leaf Meal, World Applied Sciences Journal, 28 (4): 532-539

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Abstract: Livestock husbandry plays a pivotal role in the agrarian society of Ethiopia. Small ruminants are mostly reared by landless and small land holders to support their income and as a source of food. However, due to population pressure and increase in crop husbandry the grazing land is shrinking at a fast pace. Seasonal shortage of fodder is a regular occurrence thereby affecting the reproductive and productive performance of the livestock. Hence, use of perennial trees is becoming popular to supplement the meager feed resources available in the area, one such tree which is commonly used by the farmers of Gedeo region of Ethiopia is the Millettia ferruginea, however there was lack of scientific information about the use of this tree as a source of fodder. A study was conducted to assess the effect of feeding graded levels of Millettia ferruginea leaf meal to Arsi Bale rams native to the region, the treatment encompassed four diets T1,T2,T3 and T4 which was contained 0, 1, 2 and 3% of the body weight of the rams. The leaf meal was fed for 90 days and body weight of the rams was assessed on a weekly basis, at the end of the experiment blood was taken by veni puncture and serum was obtained after clotting of the whole blood this was carried out to assess some serum biochemical parameters which were important to understand the effect of the leaf meal on some vital organs of the rams. The rams were slaughtered after overnight fasting. The results indicated that average crude protein levels of the leaf meal was 23.58% and the level of condensed tannin (as leucocyanidin equivalent) was 0.413. The results indicated that while there was no significant difference between the slaughter weight of the rams across treatments, there was different \( P< 0.01 \) with higher values observed for rams receiving T2 diet, while rib eye area was assessed to be higher for those receiving T3 diet. The study further indicated that there were no significant differences among all the serum biochemical traits studied. Therefore, it can be concluded from the study that Millettia ferruginea leaf meal can be incorporated as an affordable source of fodder for sheep.

Key words: Millettia ferruginea leaf meal, Arsi Bale rams ,Carcass traits ,Serum biochemistry, Ethiopia

Senbeto Funte\(^1\), *Tegene Negesse\(^2\) and Legesse G\(^2\), 2010. Feed resources and their management systems in Ethiopian highlands: The case of Umbulo Wacho watershed in Southern Ethiopia, Tropical and subtropical Agriecosystems, 12: 47-56

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Abstract: A study was conducted to assess the prevailing feed resources and feeding management systems in Umbulo Wacho watershed, southern Ethiopia. The data used were obtained through individual interviews conducted on 85 randomly selected livestock owners, group discussions with key informants and from secondary sources. In the study area, livestock provide draught power, milk, meat and manure. Cattle were the dominant livestock species and cows comprised 36% of the total number of cattle. The average landholding per household was 0.7 ha, of which 0.1 ha was reported as grazing land. Communal and private grazing lands were gradually shrinking due to the expansion of crop production. This led to the growing practice of tethering and stall-feeding. The annual feed DM yield was only two-third of the DM requirement for livestock kept in the area. Natural pasture, crop residues, crop stubbles, enset by-products and sugarcane top were among the main feed resources. Crop residues were found to be major feed resources for the livestock in the study area, particularly during the dry season in which the biomass of the natural grazing lands is very minimal. To be able to bring about a positive impact on livestock production, increasing the quantity of crop residues through crop breeding and their nutritive value by physical and chemical treatments are recommended.

Key words: Crop residues; dry matter requirement; feed; feed DM yield; livestock; natural pasture.

Shewangzaw Wolde\(^1\), *Tegene Negesse\(^2\) and Aberra Melesse\(^2\), 2011. The Effect of Dietary Protein Concentration on Nutrient Utilization of Rhode Island Red Chicken in Wolaita (Southern Ethiopia), Tropical and Subtropical ecosystems, 14: 271-278

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Abstract: The effect of dietary crude protein (CP) concentration on feed intake, nutrient retention and efficiency of utilization of growing Rhode Island Red (RIR) chicks fed for a period of 12 weeks from 9 to 93 days of age was assessed and CP requirement determined in Wolaita, southern Ethiopia. Diets with 14% (T1), 16% (T2), 18% (T3), 20% (T4) and 22% (T5) CP levels were evaluated. At the beginning of trial, ten chicks whose average weight was closest to weight of chicks in experimental groups were slaughtered and at the end of the experiment, 3 selected male and 3 female (1 male and 1 female per replicate) were slaughtered for efficiency of utilization of protein (EUP) estimation. Dry matter intake (DMI) of chicks with different levels of CP was not different (P>0.05). T3 had the highest and T2 the lowest (P<0.05) intake values of most of the nutrients. Chicks in T1 retained significantly (P<0.05) lower protein than chicks fed on T3. Chicks were not different in energy, calcium and phosphorus retention (P>0.05). Chicks fed on T4 and T5 were lower in EUP than T2 (P<0.05) whereas chicks fed on T1 and T3 fall in between. Chicks fed different levels of dietary CP were not different in efficiency of energy and phosphorus utilization (P>0.05). Lower (P<0.05) efficiency of utilization of calcium was obtained on T1 than on T4, whereas chicks fed on T2, T3 and T5 fall in between. Optimum efficiency of nutrient utilization and retention were obtained at 16% dietary CP level and could be recommended as CP requirement of RIR chicks up to the age of 13 weeks under tropical climate. Intakes of energy (572 kJ/head), DM, Ca and P (40, 0.38 and 0.21 g/head, respectively) at 16% dietary CP level could also be recommended as daily allowances.

Key words: Dietary crude protein level, efficiency of nutrient utilization, and Rhode Island Red


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Abstract: The effect of dietary crude protein (CP) concentration on dry-matter intake (DMI), body mass gain (BWG) and carcass traits of Rhode Island Red (RIR) chicken was determined through a 12-week feeding trial (10−93 days of age) in southern Ethiopia. Diets were formulated to contain 140 (T1), 160 (T2), 180 (T3), 200 (T4) and 220 (T5) g CP kg⁻¹ DM from maize, wheat bran, soybean, sunflower cake, Niger seed (Guizotia abyssinica) cake, salt, rear premix, lysine and methionine. ME (14.36−14.84 kJ kg⁻¹ DM) and other nutrients in diets were similar. Ten chicks were randomly distributed to each of four replicates of five treatment diets in a completely randomized design. Chicks were raised in groups, and the feed offered and refusal measured daily. Body mass was measured weekly. At the beginning of the experiment, four male (1 per replicate) and four female (1 per replicate) chicks whose body mass was closest to the mean body mass of their respective groups and sexes, were selected per treatment, fasted for 12 h, weighed, slaughtered and parts of the carcass weighed. Differences in DMI and BWG of chicks fed different levels of dietary CP were not significant. Diet T2 was as efficient as the higher CP diets but more efficient than T1 in DM utilization. Chicks fed on diet T2 had significantly (P<0.05) higher total non-edible offal (TNEO) than those fed on T1, and TNEO of chicks fed on diets T3, T4 and T5 were in between. Differences in carcass mass were not significant (P<0.05) among treatment groups. Chicks fed on diet T1 had significantly (P<0.05) higher dressing percentage than those on diets T3 and T5, but similar to those on diets T2 and T4. The highest net return was from diet T2, but it was close to T1. Mortality of chicks was observed only in T1 (2.5%) and T5 (12.5%). The results suggest that 160 g CP kg⁻¹ DM is optimum for growing RIR chicks in tropical climates from 10−93 days of age.

Key words: Dietary crude protein, carcass traits, feed efficiency, Rhodes Island Red chicken


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**Abstract**: The study was conducted on estimation of eviscerated carcass weight using live weight as predictor for Arsi Bale sheep and goat of both the sexes, reared under farmer’s management and on natural pasture. The age group of the studied sheep and goat were <1 year (category 1) and >1 but < 2 years (category 2). The age of the animals were estimated by dentition method. The results indicated that the average slaughter weight of the studied animals were lower than those reported, this may be ascribed to poor nutrition obtained from the pasture grasses and also due to presence of internal parasites. The dressing percentage as assessed in the study was higher in the goats and among the goats was higher in the bucks. The study also indicates that the among the non linear and linear regression equations the best predictor for the carcass weight in rams in category 1 was by using Quadratic regression equation, while for the age category 2 it was by using the Sigmoid regression equation. The results for prediction of carcass weight in ewes indicate that the Quadratic regression equation provides the highest R values for both the age categories. 2 The regression results also shows that the best predictor for estimation of carcass weight in bucks for the age category 1 was by using the Quadratic regression method, while that for age category 2 was by using Logarithmic, growth, exponential and logistic regression method (the R2 values being same for all). The results related to estimation of carcass weight of the does indicate that the best predictor for age category 1 was by taking into account the Quadratic regression equation and that for age category 2 was by considering the power regression equation.

**Key words**: Arsi Bale sheep Arsi Bale goats Live weight Carcass weight Linear and Non Linear Regression goats analysis Ethiopia

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**Abstract**: The objective of this study was to investigate the effects of substituting sweet potato (*Ipomoea batatas* (L) Lam) vines for concentrate on growth performance, digestibility and carcass characteristics. Thirty yearling bucks (15.3 ± 1.64 kg) were assigned into six treatments in a randomized complete block design: natural grass hay alone (T1) or supplemented with 100% sweet potato vines (SPV) (T2), 65% SPV + 35% concentrate (T3), 35% SPV + 65% concentrate (T4) and 100% concentrate (T5) on dry matter (DM) basis. Supplemented goats (T2, T3, T4 and T5) consumed higher (p< 0.001) total DM (553, 567, 505 and 515 g/day), respectively, when compared to the non-supplemented (T1) goats (349 g/day). The crude protein (CP) intake (32.0, 48.6, 54.7, and 69.2 g/day) increased with increasing levels of the concentrate in the diet for T2, T3, T4 and T5, respectively. The DM digestibility in T2, T3, T4 and T5, respectively, was higher (P< 0.01) (0.69, 0.72, 0.72 and 0.74) than in T1 (0.56). Apparent digestibility of CP was observed to be higher (P< 0.001) in T3, T4, T5 (0.78, 0.83, 0.88) when compared to the bucks in T2 (0.60). Higher (P< 0.001) daily weight gain (31.2, 46.4, 48.6 and 47.6 g/day) were recorded for T2, T3, T4 and T5, respectively, whereas the non-supplemented goats lost weight (-19.5 g/day). Slaughter weight, empty body weight, hot carcass weight, dressing percentage, rib-eye muscle area and total edible offals were higher (P< 0.05) in supplemented goats compared with non-supplemented ones. Therefore, it could be concluded that sweet potato vine can replace the conventional concentrate and could be fed with poor quality hay to prevent body weight loss of animal in the absence of other feed supplements.

**Key words**: Substitution. Sweet potato vine. Carcass characteristics. Digestibility. Sidama goats

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**Abstract**: The objective of this study was to investigate the effects of substituting sweet potato (*Ipomoea batatas* (L) Lam) vines for concentrate on growth performance, digestibility and carcass characteristics. Thirty yearling bucks (15.3 ± 1.64 kg) were assigned into six treatments in a randomized complete block design: natural grass hay alone (T1) or supplemented with 100% sweet potato vines (SPV) (T2), 65% SPV + 35% concentrate (T3), 35% SPV + 65% concentrate (T4) and 100% concentrate (T5) on dry matter (DM) basis. Supplemented goats (T2, T3, T4 and T5) consumed higher (p< 0.001) total DM (553, 567, 505 and 515 g/day), respectively, when compared to the non-supplemented (T1) goats (349 g/day). The crude protein (CP) intake (32.0, 48.6, 54.7, and 69.2 g/day) increased with increasing levels of the concentrate in the diet for T2, T3, T4 and T5, respectively. The DM digestibility in T2, T3, T4 and T5, respectively, was higher (P< 0.01) (0.69, 0.72, 0.72 and 0.74) than in T1 (0.56). Apparent digestibility of CP was observed to be higher (P< 0.001) in T3, T4, T5 (0.78, 0.83, 0.88) when compared to the bucks in T2 (0.60). Higher (P< 0.001) daily weight gain (31.2, 46.4, 48.6 and 47.6 g/day) were recorded for T2, T3, T4 and T5, respectively, whereas the non-supplemented goats lost weight (-19.5 g/day). Slaughter weight, empty body weight, hot carcass weight, dressing percentage, rib-eye muscle area and total edible offals were higher (P< 0.05) in supplemented goats compared with non-supplemented ones. Therefore, it could be concluded that sweet potato vine can replace the conventional concentrate and could be fed with poor quality hay to prevent body weight loss of animal in the absence of other feed supplements.

**Key words**: Substitution. Sweet potato vine. Carcass characteristics. Digestibility. Sidama goats
Abstract: A study was conducted to describe the production systems and management practices and investigate the physical linear body measurements of Washera sheep in the traditional farming systems in the western highlands of the Amhara National Regional State, Ethiopia. Data was collected using focus group discussion and field measurements. The agricultural production system in the study area was mixed crop-livestock. Livestock production and crop production complement each other in such a way that livestock are used as a source for draft and manure for crop production and from crop production the crop residues, straws and aftermath serve as main components of livestock feeds in the study areas. The main component of feed for sheep is communal pasture. Farmers house their sheep throughout the year together with other livestock separated by a woodlot. Breeding is allowed year round. Docking the fat tail of ewe lambs, for ease of mating, is a common practice. The average flock size per household obtained in the present study was 9.58 sheep. The total flock age composition was 52.2, 9.9, 8.3, 5.2 and 24.3%, young stock with milk teeth, sheep with 1 pair of permanent incisor (PPI), 2 PPI, 3 PPI and 4 PPI & above, respectively. The overall least squares mean of body weight, wither height, body length, heart girth, pelvic width and ear length obtained were 26.7±0.45 kg, 69.0±0.36 cm, 57.7±0.33 cm, 74.4±0.49 cm, 14.3±0.12 cm and 9.73±0.08 cm, respectively. The fixed effects of district, sex, dentition and the interaction between sex & dentition were sources of variation for the most of the response variables. The high correlation coefficients observed between body weight and heart girth for all dentition groups suggest that heart girth alone or in combination with other body measurements could provide a good estimate for predicting live weight of Washera sheep at different dentition groups. The differences in the coefficient of determination of the equations fitted between different dentition groups indicated that weight can be estimated using different equations for different age groups with different accuracies.

Key words: docking, heart girth, Quarit, weaning methods, Yilmanadensa


Abstract: The biomass production and nutritive value of the natural pasture of Umbulo Wacho watershed in Southern Ethiopia were studied. The upper and medium altitudinal zones had an open area and areas closed for 2, 3 and 4 years and the lower altitude had an open area and an area closed for 2 years. In each of the open and closed areas, three sites were selected (9 in open, 21 in closed) at each of which exclusion cages (30) were fixed. The re-growths of forage samples were cut at 30 days interval from May up to November from the exclusion cages. The overall dry matter (DM, %), organic matter (OM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), ash, calcium (Ca) and phosphorus (P) contents of the forages were 30.8, 83.9, 12.7, 66.7, 32.6, 4.5, 16.2, 0.6 and 0.3%, of the DM, respectively; in vitro DM digestibility (IVDMD) was 72.1% and DM yield (DMY) was 71.34 g/1.21 m/30 d (0.59 tones/ha/30 d). The natural pasture (117.1 ha) produced 829.07 tones of DM/year (0.59 * 117.1*12) which can only meet 8.20% of the total DM requirement (10,107.11 tones/year) of the tropical livestock unit (4431) found in the watershed. Closing an area for long duration decreased (P< 0.01) CP, P, DMY and IVDMD, but increased ADF and ash. Advance from the rainy season towards the dry period reduced (P< 0.01) DM, DMY, CP, ADF, ash and P. With increasing altitude, DM increased (P< 0.01) but DMY, NDF and P decreased. The IVDMD was positively correlated with DMY and negatively correlated with NDF and ash (P<0.05). The interactions among closed or open areas, sampling time and altitude were significant (P< 0.05) for most of the nutrient content and yield parameters. The forages could be cut twice (middle and end of the rainy season) when the nutrient contents are optimal. For integrated and sustainable use of forages in the watershed, further study in improvement of quality and utilization is suggested.

Key words: Forage; Dry Matter; Watershed; Natural Pasture

Tegene Negesse1,2, Patra A.K.2, Dawson L.J.1, Adugna Tolera1,2, Merkel R.C.2, Sahlu T.2 and *Goetsch A.L.2, 2006. Performance of Spanish and Boer x Spanish doelings consuming diets with different levels of broiler litter. *Small Ruminant Research, 69(1-3): 187-197
Academic Success Depends on Research and Publications

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Abstract: Sixty Spanish (S) and 40 Boer × Spanish (BS) doelings (14.9 ± 3.8 and 21.9 ± 3.8 kg initial BW, respectively, and approximately 6 months of age) were used in an experiment with four 3-week periods to determine effects of dietary broiler litter (L) level on growth performance. There were two groups per treatment with six S and four BS doelings in each. Dietary treatments were 20% coarsely ground millet hay and 80% concentrate, which consisted of 0 (0L), 20 (20L), 40 (40L), or 60% L (60L; total dietary level). An additional treatment was 80% hay and 20% concentrate (80F). Concentrate (primarily corn and L when included) DM intake (DMI) was 700, 593, 652, 387, and 165 g/d (SE = 20.3) and total DMI was 883, 755, 825, 490, and 696 g/d (SE = 35.5) for 0L, 20L, 40L, 60L, and 80F, respectively. There was a dietary treatment x period interaction in ADG (period 1: 104, 29, 36, -44, and 47 g; period 2: 124, 102, 53, -74, and 12 g; period 3: 175, 126, 126, 87, and 80 g; period 4: 161, 151, 136, 66, and 51 g for 0L, 20L, 40L, 60L, and 80F, respectively (SE = 12.2)). Treatment and genotype also interacted in ADG (S: 107, 85, 72, 8, and 36 g; BS: 174, 118, 103, 10, and 60 g for for 0L, 20L, 40L, 60L, and 80F, respectively (SE = 9.2)). ADG:DMI ranked (P < 0.06) 0L > 20L > 40L > 80F > 60L (152, 130, 102, 18, and 65 g/kg for 0L, 20L, 40L, 60L, and 80F, respectively; SE = 6.12). The acetate:propionate ratio in ruminal fluid was greater (P < 0.05) for 60L and 80F than for other treatments (1.60, 1.73, 2.18, 3.80, and 3.67 for 0L, 20L, 40L, 60L, and 80F, respectively; SE = 0.27). Liver Cu concentration at the end of the experiment was influenced by dietary treatment (88, 275, 478, 286, and 47 ppm for 0L, 20L, 40L, 60L, and 80F, respectively; SE = 53.2). In conclusion, L can be effectively used in diets for growing meat goats, but high levels, such as above 40% of dietary DM, may restrict performance primarily via limited feed intake. However, the level of L below this threshold impacts efficiency of feed utilization.

Keyword: Females, Digestibility, feeds, Young animals, Goats, Mineral metabolism, Nutrient uptake, Crossbreds, nutrient utilization

*Tegene Negesse1 and Asrat Tera2, 2010. Effects of feeding different levels of cooked and sun dried fish offal on carcass traits of growing Rhode Island Red chicks, Trop Anim Health Prod., 42(1): 45–54

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Abstract: Fourteen days old Rhode Island Red chicks were used to evaluate effects of processed fish offal (fishmeal) on DM intake (DMI), body weight gain (BWG), feed conversion ratio (FCR = DMI/BWG) and carcass traits. Ten chicks were assigned to each of 3 replicates of 6 diets (T1, T2, T3, T4, T5, T6, containing 0, 3.32, 6.64, 9.96, 13.28 and 16.6% fishmeal, respectively, having 18.44–19.82% CP). After 77 days of ad-lib feeding, 3 male and 3 female chicks per treatment were fasted overnight, killed and body parts weighed. T1 had lowest but T6 highest (p ≤0.001) daily intakes of 68.5 and 77.0 g DM head−1, 13.3 and 14.8 g CP head−1 and 231 and 243 kcal ME head−1, respectively. BWG (10.7 g head −1 d−1), FCR (6.79), weights of carcass (569 g), breast (160 g) and total edible (676 g) and dressing % (66%) of T1 (0% fishmeal) was smaller (p ≤0.001) than those of fishmeal groups {12.8 to 13.5 g head−1 d−1; 5.83 to 6.35 g; 671 to 729 g; 196 to 219 g; 807 to 876 g and 67 to 68%, respectively}. Best results of BWG, FCR and carcass traits were obtained at 9.96% fishmeal inclusion level; however acceptable results could be obtained up to 12.5%.

Key words: Carcass traits, Chicks, Fishmeal, Protein supplement

*Tesfa Geleta1, Tegene Negesse2, Girma Abebe2 and Goetsch A.L3., 2013. Effect of supplementing grazing Arsi-Bale sheep with molasses-urea feed block on weight gain and economic return under farmers’ management condition, Journal of Cell and Animal Biology, 7(10): 125-131

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Abstract: Sheep fattening with Molasses-urea feed block (MUB) was undertaken in Adami Tulu Jido Kombolcha District at Aneno and Arba villages for 87 days during both dry (from 22 March to 17 June) and during wet season (from 19 August to 10 November, 2009). A study was conducted to determine the performance and profitability obtained from MUB supplemented grazing sheep. Molasses, urea, wheat bran, finely ground haricot bean haulm, salt, and bindinder (cement and termite mould) were used as ingredients to produce three different MUBs; Treatment two (T2), Treatment three (T3) and Treatment four (T4) with 17.72, 20.96 and 24.6% CP, respectively. Six sheep were randomly allotted to each of T1, T2, T3 and T4 during both dry and wet seasons at each village. Sheep in T4 had higher overall average daily weight gain (ADWG) (74.8 ± 11.13 g/head/day followed by T2, T3 and T1 (72.88 ± 9.27, 58.5 ± 12.98 and 33.67 ± 3.03) g/head/day, respectively. Overall total body weight gain (TBWG) of T4 was higher (6.26 ± 0.53) kg, followed by T2, T3 and T1 (6.13 ± 0.46, 4.92 ± 0.64 and 2.83 ± 0.39) kg, respectively. Differences (P< 0.05) between control (T1) and T4; between T3 and T4, between T1 and T2, between T3 and T2 in overall ADWG and TBWG were significant (P< 0.05) but differences between T1 and T3, between T2 and T4; not significant (P> 0.05). ADWG (67.96 ± 10.31) g/head/day and TBWG (5.91 ± 0.87) kg of sheep at Aneno village was significantly (P< 0.05) higher than the ADWG (51.79 ± 9.41) g/head/day and TBWG (4.51 ± 0.75) kg of sheep at Arba village. Significant difference (P< 0.05) in ADWG and TBWG was observed between seasons with the higher gain during wet season (67.33 ± 11.43) g/head/day growth rate and 5.86 ± 0.43 kg total weight gain as compared to dry season (52.07 ± 8.3) g/head/day growth rate and 4.53 ± 0.39 kg total weight gain. The interaction of season by village was not significantly influenced both ADWG and TBWG of sheep. Marginal rate of return of T2 is higher (123.46) followed by T3 (77.16) and T4 (65.64). From the biological and economic data analysis, we can conclude and recommend that MUB with 17.72% CP could be used as supplement for sheep fattening in mid rift valley of Ethiopia.

Key words: Feed block, crude protein, weight gain, growth rate, return.


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Abstract: The study was conducted to describe the purposes of goat keeping, breed preferences and selection criteria in Hamer and Bena-Tsemay pastoral and agro-pastoral districts of South Omo zone. Data were collected through household interviews using structured questionnaires administered to 250 respondents. All the goats in the study districts are indigenous genotypes. In both districts, goats are kept primarily for socio-economic purposes and secondly for socio-cultural functions. The role of goats as a source of meat, milk and blood was ranked third. The households valued highly for adaptation traits of goats such as tolerance to drought and disease resistance above performance traits. The households’ 88% in Hamer and 70% in Bena-Tsemay districts prefer dual purpose goat genotypes (meat and milk) than either meat or milk types. Over 90% of households have own bucks for breeding. The households in the study districts consider larger body size and reproductive performance characteristics of individual goats and their relatives when selecting replacement animals. The study indicated that the information obtained would assist in planning suitable goat breeding and extension programs in the zone.

Keywords: adaptation, breeding, dual purpose, extension, traits


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Academic Success Depends on Research and Publications

Abstract: This study was conducted in Alaba district of Southern Ethiopia to describe smallholder sheep and goats marketing systems, identify marketing constraints and suggest improvement options to enhance incomes of smallholder producers. Informal and formal study tools of focused group discussion, key informant interview; household survey and rapid market appraisal were employed to gather information from development partners, smallholder farmers, traders, transporters and consumers. Smallholder farmers sale sheep and goats to fulfill immediate household cash needs, particularly to acquire food items. Smallholder producers, small and large traders, brokers, transporters and consumers are the major market participant across the market channels. Mode of marketing is mainly on ‘eye-ball’ basis with one-on-one price negotiation. Farmers market animals of different age, sex and weight either at farm gate or local markets, while a range of traders are involved at various stages of markets until the animals reach final consumers. Supply, demand and price of animals have clear seasonal variations. Abuse by brokers, lack of price information, access to incentive markets, poor market infrastructure and seasonality of markets are the major challenges in improving benefit and livelihood of smallholder sheep and goat producers. Commercialization of smallholder systems, standardizing marketing with marketing information and infrastructures, integrated intervention of the market channels along the value chains and market actors, formation of marketing groups and co-operatives could improve marketing efficacy and profitability of smallholder sheep and goat system.

Key words: Sheep, Goats, Smallholder farmers, Marketing system, Value chain, Constraints, Market innovation, Alaba, Southern Ethiopia


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Abstract: Forage species of the natural pasture of Assosa Zone of Benshangule-Gumuz (Western Ethiopia) were identified and their chemical composition and in vitro dry matter digestibility (IVDMD) determined. Data were collected from two farming systems (shifting cultivation: SC and permanent farming system: PFS) and two grazing types (communal grazing land: CGL, riverside grazing land: RSGL). A total of 18 grasses, 2 legumes, sedge, 2 forbs and 17 trees/shrubs were identified from the natural pasture of both farming systems. Hyparrhenia rufa had significantly lower NDF and Eleusine floccifolia and Pennisetum catabasis had significantly lower ADF than those of other grasses. IVDMD of E. floccifolia and P. catabasis were significantly higher than that of Chloris pycnothrix, H. rudis, H. rufa, H. collina1, H. collina2 and Sporobolus pyramidalis. Crude protein (CP) content of E. floccifolia was significantly higher than that of other species except H. hirta. The DM and CP contents of Bauhinia farea were the highest (P<0.05) among browse species. Grasses such as C. pychnotrix, H. collina, Digitaria abyssinica, H. hirta, H. rudis and S. pyramidalis were dominant in the study area. Herbaceous biomass production of the CGL in SC was 2,495 kg/ha and that of the RSGL in PFS was 1,244 kg/ha. Continuous overstocking of RSGL decreased the proportion of desirable forage species and encouraged invasion with unpalatable species such as S. pyramidalis and H. collina. It is suggested to study the nutritive value of dominant species, distribution and conservation of highly palatable species and designs for appropriate management interventions.

Key words: Digestibility, species composition, farming system, nutritive value


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Abstract: Appropriate land use decisions are vital to achieve optimum productivity of the land and ensure environmental sustainability. Physical land suitability was carried out in Abobo area, western Ethiopia, following the FAO methodology for the determination of length of growing period and maximum limitation method for suitability classification. The result of the study revealed that the climate of the study area is moderately suitable (S2) for the considered varieties of cotton, maize and sorghum, whereas it is marginally suitable (S3) for upland rice. Considering soil and landscape suitability, the most limiting factors were soil depth, wetness, and soil fertility, mostly nitrogen. Based on the FAO model, the potential yields of cotton, maize, upland rice and sorghum were 2,645, 6,409, 4,774 and 4,194 kg ha⁻¹, respectively. However, yield reductions of 7.32 to 12.09% and 6.01 to 11.16% were observed in simulated rainfed yield for maize and upland rice, respectively, as compared with their corresponding potential yields. The differences might mainly be induced due to water limitation, soils and landscape attributes, which suggests use of supplementary irrigation and soil management for optimum and sustainable production. All the limitations, except soil depth, can be improved so as to attain the potential suitability through improving and sustaining soil OM and practicing integrated soil fertility management.

Key words: Suitability evaluation, potential yield, rain-fed yield, limiting factor

*Teshome Yitbarek¹, Heluf Gebrekidan¹, Kibebew Kibret¹ and Shelem Beyene², 2013. Impacts of land use on selected physicochemical properties of soils of Abobo area, western Ethiopia, Agriculture, Forestry and Fisheries, 2(5): 177-183

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Abstract: Assessing land use-induced changes in soil properties are essential for addressing issues of agro-ecosystem transformation and sustainable land productivity. In view of this, a study was conducted to assess the impact of land use/land cover on the physicochemical properties of soils of Abobo area, western Ethiopia. Three adjacent land use types, namely forest, grazing and cultivated lands each falling under four land mapping units (1Ac, 1Bc, 2Cc and 3Cl) were considered for the study. A total of 40 random soil samples (0-20 cm depth) were collected to make three composite samples for each land use type across the land mapping units and analyzed for selected soil physical and chemical properties. The results of the study, on one hand, revealed that soil OM, total N, CEC, PBS and available micronutrients (Fe, Mn, Zn and Cu) contents of the cultivated land was significantly (P< 0.001) lower than the adjacent forest land. For instance, soil OM, total N, CEC, PBS, exchangeable Mg and available micronutrients (Mn, Zn and Cu) contents of cultivated land was significantly lower than the adjacent forest land by 32.98, 33.33, 16.16, 17.81, 21.88, 29.47, 40.05 and 53.92%, respectively. On the other hand, the results of the study revealed that exchangeable cations (Mg, K and Na), PBS and available micronutrients (Fe, Mn, Zn and Cu) contents of the gazing land was significantly (P< 0.001) lower than the adjacent forest land. However, significant differences were not observed between the forests and grazing lands in soil OM, total N, CEC and available P. From the present study, it could be concluded that the soil quality and health were maintained relatively under the forest, whereas the influence on most parameters were negative on the soils of the cultivated land, indicating the need for employing integrated soil fertility management in sustainable manner to optimize and maintain the favorable soil physicochemical properties.

Key words: Land Use, Physicochemical Property, Soil Quality

Tibebu Manaye¹, *Adugna Tolera² and Tessema Zewdu¹, 2009. Feed intake, digestibility and body weight gain of sheep fed Napier grass mixed with different levels of Sesbania sesban, Livestock Science, 122: 24-29

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Abstract: A randomized complete block design was employed to assess the feed intake, nutrient digestibility and live weight gains of hair type local sheep (~18.0 kg initial live weight) fed Napier grass (Pennisetum purpureum) mixed with different levels of Sesbania (Sesbania sesban). The treatments were sole Napier grass (control) and four Napier grass-Sesbania mixtures consisting of 100, 200, 300, and 400 g/kg of Sesbania on dry matter (DM) basis. The ratio of mixing the two feeds was adjusted every week based on DM content of each feed component to maintain a constant ratio on DM basis. The DM, ash, crude protein (CP) and acid detergent lignin (ADL) contents of the Napier grass-Sesbania mixtures increased as the proportion of Sesbania increased and the reverse was true for organic matter (OM), neutral detergent fibre (NDF) and acid detergent fibre (ADF) contents. The DM intake was higher (P<0.05) in the mixed diets than in the sole Napier grass diet while the OM intake was higher (P<0.05) in the diet containing 400 g/kg of Sesbania (52.9 g kg W\(^{-0.75}\) day\(^{-1}\)) than Napier grass alone (47.5 g kg W\(^{-0.75}\) day\(^{-1}\)). Crude protein intake increased with increased inclusion level of Sesbania in the diet. Dry matter and OM digestibilities were higher (P<0.05) in the mixed diets containing 200, 300 and 400 g/kg Sesbania than Napier grass alone. Crude protein digestibility was significantly higher (P<0.05) in all the mixed diets than sole Napier grass diet whereas NDF digestibility was higher in the mixed diet containing 400 g/kg Sesbania than sole Napier grass diet. The sheep that were fed the diet containing 300 g/kg Sesbania foliage showed significantly higher (P<0.01) average daily body weight gain (103 g/day) than the unsupplemented control group (75.6 g/day). In general, all the experimental sheep showed good growth performances throughout the experimental period.

Key words: Napier grass, Sesbania sesban, Feed intake, Digestibility, Body weight gain

Tollossa Worku\(^1\), Edessa Negera\(^2\), Ajebu Nurfeta\(^3\) and *Haile Welearegay\(^3\), 2012. Microbiological quality and safety of raw milk collected from Borana pastoral community, Oromia Regional State. African Journal of Food Science and Technology, 3(9): 213-222

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Abstract: The effect of source of sample points on microbiological quality and safety of cow’s milk was evaluated in six kebeles of Abaya District of Borana pastoral area of Oromia Regional state. A total of 96 raw milk samples from cow udder and storage containers were aseptically collected following standard methods to determine total bacteria counts (TBC), coliforms counts (CC), and fecal coliforms counts (FCC), total staphylococci counts (TSC) and Isolation and identification of the safety related bacteria. Dye reduction tests were also used to evaluate the hygienic condition of the milk samples. The color disappearance time of methylene blue (MBT) and resazurine (RT) test of milk samples collected from both households (HH’s) were 2.22 and 2.0 hours (Hrs), respectively. There was significant variation in TBC, CC and FCC among kebeles. Similar values were observed in TSC among kebeles. There was no significant difference (p>0.05) among non-model and model HH’s in TBC, CC, TFC and TSC. The dominant pathogens isolated from the raw milk samples collected from the udder and storage containers are Staphylococcus aureus, Staphylococcus intermedius, Staphylococcus epidermidis, and Micrococcus luteus, Eschericha coli, Klebsiella, Enterobacter, Citrobacter, Proteus, Pseudomonas, Salmonella, Shigella and Yersinia species. The high level of counts and isolate numbers and types found in the sampled cow milk represent a poor keeping quality of milk and public health risk to the consumer. This suggests the need for improved hygienic practice at all levels of milk production in the pastoral community.

Key words: Raw milk, bacterial counts, microbial safety, pastoral community, Ethiopia

Wondwosen Alemu\(^1\), *Solomon Melaku\(^1\), Adugna Tolera\(^2\), 2010. Supplementation of cottonseed, linseed and noug seed cakes on feed intake, digestibility, body weight and carcass parameters of Sidama goats, Tropical Animal Health and Production, 42(4): 623-631

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Abstract: A digestibility, feed intake, and carcass evaluation experiment using 20 yearling intact male Sidama goats weighing 16.4 +/- 0.63 kg (mean +/- SD) was conducted in Ethiopia with the objectives to determine feed intake, digestibility, body weight (BW) gain, and carcass parameters. The treatments included feeding natural pasture hay (T1, control) and supplementation with cottonseed cake (284 g-T2), linseed cake (250 g-T3), and noug seed cake (296 g-T4) on dry matter (DM) basis to supply 85 g crude protein (CP) per head per day. Randomized complete block design for feed intake and BW parameters and complete randomized design for digestibility and carcass parameters were used. Hay DM intake was higher (P<0.01) for T1 than for the other treatments. T3 promoted higher (P<0.01) DM (29.3 g/kg W(0.75)/day) and CP (14.1 g/kg W(0.75)/day) intake than T4 (8.9 g/kg W(0.75)/day DM and 4.1 g/kg W(0.75)/day CP). T3 showed better (P<0.05) organic matter and CP digestibility than T2. Goats in T3 had higher nitrogen intake (P<0.01) and retention (P<0.05) than those in T1. Goats in T2 and T3 showed higher (P<0.05) daily BW gain and final BW than those in T4 and T1. Goats in T2 and T3 had higher (P<0.05) slaughter weight, empty BW, hot carcass weight, rib-eye muscle area, and dressing percentage on slaughter weight basis than those in T1. The results showed that T2 and T3 had similar effect on CP intake, daily BW gain, and carcass parameters for growing Sidama goats fed natural pasture hay.

Key words: Body weight, Digestibility, Feed intake, Nitrogen retention, Oil seed cakes, Sidama goats


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Abstract: Animal response trials aimed at investigating the effect of different levels of mango fruit waste (MFW) on growth performance and carcass characteristics of Cobb-500 broiler chickens were carried out. One-hundred sixty day-old chicks with similar body weight were randomly distributed to four treatment diets each with four replications. The four treatments were T1 (100% maize + 0% MFW), T2 (90% maize + 10 % MFW), T3 (80% maize + 20% MFW) and T4 (70% maize + 30% MFW). The experiment was conducted for 7 weeks, during which feed intake and body weight were measured. At the end of the experimental period, 2 chicks from each replication were randomly selected and slaughtered to evaluate the effect of MFW on carcass yields. The average individual daily feed intake was 65.3, 65.6, 70.8 and 66.9 g for T1, T2, T3 and T4, respectively. At the age of 7 weeks, chicks fed on T1, T2, T3 and T4 diets had individual body weights of 1178, 1165, 1066 and 860 g, respectively. Average daily individual weight gain for the respective T1, T2, T3 and T4 was 21.0, 17.6, 16.0 and 13.7 g. The feed conversion ratio (g feed/g gain) was 3.49, 3.96, 4.50 and 5.23 g for T1, T2, T3 and T4, respectively. The dressing percentage of T1, T2, T3 and T4 was 58.6, 62.1, 65.1 and 65.9, respectively. No significance differences were observed in all carcass traits between chickens fed on control diet and treatment diets. Chickens fed on control diet had significantly higher abdominal fat than those of treatment diets. Higher mortality rate was noted in T1 (10%) followed by T2 (2.5%). No mortalities were observed in those chickens fed on T3 and T4 diets. Mango fruit waste can be incorporated up to 20% of the diets of grower broiler chickens without affecting nutrient intake and growth.

Key words: Mango Fruit Waste; Maize; Cobb-500 Broiler Chickens; Growth Performance; Carcass Traits


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Abstract: Two experiments were conducted simultaneously to evaluate the effects of different concentrates to roughage ratios on growth performance and attainment of puberty in Friesian-Boran crossbred heifers. Weaned 50% Friesian-Boran crossbred female calves were used in both experiments with 25 and 20 calves
in experiments I and II, respectively. In experiment I, the calves were offered diets with concentrate to roughage ratios of 50:50 (treatment 1) or 30:70 (treatment 2). In experiment II, the calves grazed for 8 h a day and supplemented with 2 kg hay and 1 kg concentrate per head per day (treatment 1) or only 2 kg hay per head per day (treatment 2). The concentrate mixture was composed of 34% wheat bran, 31% wheat middling, 31% noug cake, 3% limestone, and 1% salt. In experiment I, heifers fed a ration with 50% concentrate and 50% roughage had higher (P< 0.05) daily body weight gain (0.532 kg) and attained puberty at 221 kg (65% of the mature body weight) in 15 months, while heifers fed a diet with 30% concentrate and 70% roughage gained 0.434 kg/day and reached puberty at 247 kg (70% of the mature body weight), about 3 months later. Heifers in treatments 1 and 2 of experiment II reached puberty 5 and 12 months later, respectively, than those in experiment I. In experiment II, heifers given 1 kg of concentrate supplement had higher (P< 0.05) daily body weight gain (0.346 kg) than those given only 2 kg hay in addition to grazing (0.278 kg). Growth rate of crossbred heifers was enhanced and age at puberty was reduced by changing the rearing management from outdoor to indoor and with increasing level of concentrate in the ration. This helps to bring the dairy heifer into production earlier and enhance to the overall productivity of the dairy industry.

Key words: Concentrate/roughage ratio, Crossbred heifer, Growth rate, Puberty, Reproduction


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Abstract: The village chicken production system and performance of local chickens were investigated in west Amhara region of Ethiopia with the major objective of assessing chicken production system in 196 households. Data were collected through interview by using pretested structured questionnaires, group discussion with key informants and direct observation. The results indicated that the average flock size holding per household was 7.9 chickens. All chicken owners provide supplementary feed, which they get from farm produced (82.7%), market (2.6%) and both farm produced and market (10.2%). The majority (83.7%) of households spread the feed supplement on the ground while only 16.3% of them use local made feeders. About 57% households provide feed supplementation during rainy season while 38.8% of them provide year round. Only 11.7% of the households construct separate housing while the majority of them share their main house. Predation (96.9%) was identified as the primary production constraint in the study area. The average age at first lay for village chickens was 6.6 months with an average clutch number of 3.2. About 14 eggs were produced per clutch with a yearly egg production of 43.2 per hen. In conclusion, the study indicated that the productivity of the village chickens was found to be very low and thus calls for appropriate interventions to be undertaken which should focus on the improvement of feeding, housing, breeding and health care of local chickens.

Key words: Ethiopia, indigenous chicken performance, local chicken populations, rural community

Yonas B¹, Beyene F², Negatu L² and *Ayana Angassa¹³, 2013. Influence of Resettlement on Pastoral Land Use and Local Livelihoods in Southwest Ethiopia. Tropical and Subtropical Agroecosystems, 16(1): 103-117

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Summary: This study was conducted in southwest Ethiopia with the aim of understanding the influence of resettlement on pastoral land use. Data were collected using a semi-structured questionnaire and focus group discussion. Respondents in nonresettled kebele reported that livestock keeping was the main source of their livelihoods. Our results showed that resettlement accelerated crop cultivation and contributed to shifts in land use due to the expansion of crop farming. Respondents mentioned that the condition of grazing resources and
livestock economy were adversely affected. The community further claimed that ownership right and changes in resource use were additional deriving forces of conflict over resources. It was also indicated that the deteriorating condition of rangelands linked to resettlement greatly undermined local livelihoods and land tenure security. Recognizing the livelihood strategy of pastoral communalities and tenure security could improve sustainable use of natural resources and conservation of biodiversity. We suggest active participation of the local community to minimize the negative impacts of resettlement on the host community, while implementing resettlement as a strategy to secure food self sufficiency. A robust understanding in planning and implementation of resettlement is needed in consolidating concerns of the host community for minimizing conflict and securing land tenure.

Key words: Resettlement; Rangeland Condition; Conflict; Land Tenure

SCHOOL OF PLANT AND HORTICULTURAL SCIENCES


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Abstract: An experiment was conducted at Angacha Research Station in Kembata Tembaro Zone of SNNPRS to characterize the soils of the research station and evaluate the response of potato (Solanum tuberosum L.) to potassium fertilizer. A pedon with 2 m x 2 m x 1.5 m volume was opened and horizons were described in situ. Samples were collected from all identified horizons for laboratory analysis. Increasing rates of K (0, 40, 80, 120, 200, 240, 280, and 320 kg ha⁻¹ as KCl) in RCBD with four replications were used in the experiment. Recommended rates of N and P, 111 and 39.3 kg ha⁻¹, respectively were applied to all treatments. Urea (46-0-0) and DAP (18-46-0) were used as sources of N and P. N was applied in split at planting and after tuber initiation (as side dressing). The physico-chemical characteristics of the soil showed that the soil has good soil fertility status but organic carbon (OC) content was medium (1.56%). The soil type of the research station was identified to be Alfisols. Organic carbon (OC), total N, and K contents of the soil, ranging between 0.5 and 1.56%, 0.06 and 0.25%, and 0.19 and 0.37 Cmol (+) kg⁻¹, respectively, and decrease with depth, whereas the available P content is the same (40 ppm) throughout the horizons. The composite soil sample contains moderate organic carbon (1.6%), whereas the total N (0.26%), available P and K contents are high. The potato tuber yield ranged between 43.97 t ha⁻¹ at application of 200 kg K ha⁻¹ and 53.33 t ha⁻¹ at application of 280 kg K ha⁻¹. Application of K did not significantly influence potato tuber yield, N, P and K concentrations both in leaf and tuber, exchangeable and available potassium in the soil. However, a yield advantage of 11.4% (5.47 t ha⁻¹) was obtained from the application of 280 kg K ha⁻¹ over the control, although the difference is not statistically significant. These parameters neither showed increasing or decreasing pattern with increased K application. Therefore, it is concluded that soil fertility management practices based on the findings should focus on maintaining and increasing OC content of the soil and monitoring for balances among nutrients. Based on the current finding, application of K for potato at Angacha is not required. However, since the experiment is conducted only for one year, it should be repeated to draw a sound conclusion. Besides, as potato is highly K demanding crop, periodic checking of the K status of the soil and crop response to it is important.

Key words: Argillic, potassium fertilization, potato tuber yield, exchangeable potassium.


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Abstract: Experiments were conducted to assess the importance of anthracnose in South Ethiopia, characterize isolates of Colletotrichum gloeosporioides and evaluate the efficacy of essential oils against the pathogen. In 2010, anthracnose incidence and severity were 37-57% and 16-31%, respectively. In 2011, disease incidence ranged from 33% to 65% while severity varied between 17% and 35%. Disease incidence and severity were 77% and 46%, respectively, during market surveys. Mean colony diameters of isolates were 38.6, 48.9 and 51 mm after 48hrs of growth at 20, 25 and 30 °C, respectively. Oils from Palmarosa and White cumin caused 100% inhibition of fungal growth.

Key Words: anthracnose, essential oils, inhibition, fungicides, ridomil, spot


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Abstract: An AFLP analysis was carried out to study the genetic diversity of Colletotrichum sublineolum isolates collected from a single field in southern Ethiopia. The AFLP analysis revealed the presence of genetic variation among the tested isolates. Dice similarity coefficient ranged from 0.69 to 0.96 averaging at 0.87. Cluster and principal coordinate analyses categorized the isolates into nine and six major groups, respectively. The presence of diverse isolates even in a single field should be given due consideration in future breeding programs. Such a diversity calls for a need to stack diverse resistance genes using the gene pyramiding technique to come up with durable sources of resistance against C. sublineolum. A mating type genes identification study was also conducted with the help of PCR on 23 single spore isolates of C. sublineolum collected from different parts of Ethiopia. The degenerate primers SKCM1 and NcHMG were used to amplify the mating type (MAT) genes, MAT1 and MAT2, respectively. MAT2 genes were amplified from 15 of the 23 isolates while no amplification product was obtained using SKCM1. This may suggest that Ethiopian C. sublineolum populations might be composed of only MAT2 genotypes. However, further work that includes large number of isolates from several sorghum growing regions is needed to come up with a conclusive result on the mating system of the pathogen populations in Ethiopia.

Key words: AFLP, degenerate primers, mating type, PCR


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Abstract: Aflatoxins are highly toxic and carcinogenic chemical substances produced by Aspergillus spp. on variety of agricultural commodities including groundnut. This study was conducted with the objective to assess total aflatoxin concentration in groundnut samples. One hundred and twenty groundnut samples collected from farmers' stores and markets were used for aflatoxin analysis in an ELISA test. Of these, 93 were positive while the remaining 27 were negative. The total aflatoxin levels in the positive samples varied between 15 mg/kg and 11,900 mg/kg. The current results clearly revealed heavy contamination of groundnut samples in Ethiopia, which is far beyond the Food and Agricultural Organization of the United Nations/World Health Organization (FAO/WHO) standard (15 mg/kg) and the European Union (EU) limit i.e. 4-15 mg/kg, depending on the end use of groundnut, suggesting the urgent need to apply control measures against toxicogenic fungi and associated mycotoxins. The major factors for contamination of groundnuts by aflatoxin were suggested to be pre- and post-harvest environmental factors, and poor management practices including delayed harvesting, mechanical damage at the time of harvesting, and limited curing and drying before storage.
**Key words:** Aflatoxin, ELISA, Groundnut, Mycotoxins, Ethiopia


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**Abstract:** Field experiments were conducted in the 2007 and 2008 cropping seasons in Wolayta, southern Ethiopia, to assess the reaction of 56 Ethiopian sorghum accessions and two susceptible checks (AL70 and BTx623) to anthracnose from naturally occurring inoculum. Final anthracnose severity (FAS), relative area under the disease progress curve (rAUDPC, where a commonly used susceptible cultivar, AL70, was set to 1), and anthracnose progress rate were used as evaluation parameters. All the evaluation parameters revealed significant variation among the tested accessions. In 2007, anthracnose severity varied between 6.6 and 77.7%, and in 2008 it ranged from 9.7% to 76%. The Ethiopian sorghum accessions had rAUDPC ranging from 0.13 to 0.88 in 2007 and from 0.18 to 1.35 in 2008. Anthracnose progress rate varied between 0.02 and 0.06 and from 0.01 to 0.05 units per day in 2007 and 2008, respectively. Results from the three parameters were highly correlated (0.18–0.87), suggesting FAS would be a suitable selection parameter for germplasm screening. Fifteen accessions in 2007 and 18 in 2008 were rated as resistant, with six accessions rated as resistant in both years, suggesting germplasm from Ethiopia would be useful for breeding resistance to anthracnose.

**Key words:** Anthracnose, Disease progress, Inoculum, *Sorghum bicolor*

*Alemayehu Chala*¹²³, Anne Marte Tronsmo² and Brurberg M.B²³, 2011. Genetic differentiation and gene flow in *Colletotrichum sublineolum* in Ethiopia, the centre of origin and diversity of sorghum, as revealed by AFLP analysis. *Plant Pathology*, 60: 474-482

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**Abstract:** Isolates of *Colletotrichum sublineolum* were collected from different sorghum-producing regions of Ethiopia and divided into five groups based on their geographic origin. The growth rate of 50 isolates showed considerable variation: 1.7–5.8 mm day⁻¹, mean 3.3 mm day⁻¹. However, the isolates displayed little variation in colony colour and colony margin, except for isolates from the north, which were different from the others. Amplified fragment length polymorphism analysis of 102 isolates revealed much greater variations among the different groups. Dice similarity coefficients ranged from 0.32 to 0.96 (mean 0.78). Cluster analysis and principal coordinate analysis revealed a differentiation of the isolates according to their geographic origin, and both methods clearly indicated a genetic separation between the southern, the eastern and the other isolates. Analysis of molecular variance (AMOVA) indicated a high level of genetic variation both among (42%) and within (58%) the *C. sublineolum* sampling sites in Ethiopia. The AMOVA also indicated a high level of genetic differentiation (FST = 0.42) and limited gene flow (Nm = 0.343). The results of this study confirmed the presence of a highly diverse pathogen, which is in agreement with the existence of diverse host genotypes and widely ranging environmental conditions in sorghum-producing regions of the country. Such diversity should be taken into account in future breeding programmes to achieve an effective and sustainable disease management strategy.

**Key words:** Genetic differentiation, genetic variation, sorghum anthracnose, *Sorghum bicolor*
Abstract: A two year survey was conducted to determine incidence and severity of sorghum anthracnose in different sorghum growing regions in Ethiopia. A total of 487 fields in 49 districts were surveyed in each of the 2005 and 2007 production season. Incidence of sorghum anthracnose was assessed as the percentage of plants with visible symptoms in a field, and anthracnose severity was evaluated as the percentage of leaf area with symptoms. Also, the relationship of the incidence and severity of the disease to the altitude of the fields and weather conditions were determined. Results from the 2 years survey revealed that sorghum anthracnose is present in most (84%) of the survey districts. However, both incidence and severity of the disease varied significantly (P < 0.0001) among the survey areas. Anthracnose incidence ranged from 0 to 77% and severity of the disease varied between 0 and 59% on average for the two years. The two year average anthracnose severity classes ranged from trace (< 5%) to severe (up to 59%) and the disease was generally more severe in the Southwest and South regions. However, some districts in the East and North Ethiopia also had fields with severe anthracnose infection. It was also found out that the prevailing weather conditions especially rainfall has a significant impact on both anthracnose incidence and severity.

Key words: Colletotrichum sublineolum, epidemics, Sorghum bicolor, spot

Abstract: The severity and temporal dynamics of anthracnose on susceptible (BTx623 and AL70) and resistant lines (2001PWColl#022 and 2001HarargieColl#12) were studied in field plots during the 2007 and 2008 growing seasons in southern Ethiopia. The initial, final, and mean anthracnose severities and area under disease progress curves were used as criteria to evaluate the response of the genotypes. Over the two years, the initial, final, and mean anthracnose severities ranged from 0.88 to 16.13 %, 7.56 to 78.38 %, and 3.57 to 46 %, respectively, while area under disease progress curve averaged for the two years ranged from 221.31 to 2951.88. All the evaluation criteria showed highly significant variations (P<0.0001) among the genotypes, and the Ethiopian genotype 2001PWColl#022 consistently had the lowest disease levels regardless of the evaluation criteria and growing season. The disease appeared rather late and progressed slowly on this genotype. On the other hand, the exotic cultivar, BTx623, showed the most sever anthracnose infection. Initial anthracnose severity was significantly higher and the disease developed rapidly on BTx623 than on the other three genotypes. The other two genotypes showed intermediate response and progression of the disease. Correlation and regression analyses revealed a significantly strong association between rainfall and anthracnose severity but temperature appeared to have little/no impact on the development of anthracnose in the field. The present study confirmed the effect of both host genotypes and weather, particularly rain on anthracnose development. The Ethiopian sorghum genotype 2001PWColl#022 was recommended as stable source of resistance against this important disease.

Key word: area under disease progress curve, C. sublineolum, environment, resistance, susceptible
Alemayehu Chala\textsuperscript{1}, Weinert J\textsuperscript{2}, and Wolf G.A\textsuperscript{2}, 2003. An integrated approach to the evaluation of the efficacy of fungicides against Fusarium culmorum, the cause of Head Blight of wheat, \textit{J. Phytopathology}, 151(11-12): 673-678

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Abstract: All the registered Strobilurin-containing chemicals and one Azole known for its higher efficacy to control the pathogen were compared in a fungicide trial in 2001 on wheat inoculated with \textit{Fusarium culmorum}. Two application times (BBCH 39 and BBCH 51) were used for the Strobilurin fungicides, whereas the Azole was applied at BBCH 65. Visual disease assessment, enzyme-linked immunosorbent assay (ELISA), a mycotoxin test, 1000-grain weight and yield assessment were used for evaluation, and all the techniques in different ways revealed differences in the efficacy of the chemicals. Whereas visual disease assessment showed the effect of the chemicals on symptom development, ELISA and the mycotoxin test indicated differences in the treatments on grain contamination by the pathogen and its mycotoxin, respectively. Assessment on 1000-grain weight and yield also showed the impact of the treatments in reducing the effect of the pathogen on grain production. Correlation coefficients calculated for the different parameters were significantly higher, indicating that a strong relationship existed among the various parameters used for evaluation. It was thus assumed that any of the techniques can be used to make general recommendations about the effect of chemicals on plant pathogenic fungi such as \textit{F. culmorum}.

Key words: Azole, deoxynivalenol, ELISA, mycotoxin, Strobilurin

*Asmare Dejen\textsuperscript{1}, Emana Getu\textsuperscript{2}, Ferdu Azerefegne\textsuperscript{3} and Amare Ayalew\textsuperscript{4}, 2013. Distribution and Extent of \textit{Cotesia flavipes} Cameron (Hymenoptera: Braconidae) Parasitism in Northeastern Ethiopia, \textit{International Journal of Insect Science}, 5: 9-19

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Abstract: The distribution and extent of parasitism of \textit{Cotesia flavipes} Cameron (Hymenoptera: Braconidae) on stem borer species attacking maize and sorghum were assessed in three zones of northeastern Ethiopia. \textit{Cotesia flavipes} was found to be the key larval parasitoid of cereal stem borer species in all areas surveyed. This parasitoid has been introduced into several African countries for the control of \textit{Chilo partellus} in maize and sorghum, but it has never been released in Ethiopia. The survey results indicated that the distribution and extent of parasitism of \textit{Cot. flavipes} followed the distribution and severity of its suitable host, \textit{C. partellus}. A \textit{Cotesia flavipes} parasitism rate of between 33\% and 82\% was recorded in sub-moist warm (lowland) AEZs of all zones. In contrast, a parasitism rate of less than 6\% was recorded in moist, cool highland areas where \textit{Busseola fusca} was the predominant species. \textit{Cotesia flavipes} caused lower rate of parasitism on stem borers in maize (up to 72\%) than that of sorghum (up to 82\%) in the three zones. In summary, high rates of parasitism of \textit{Cot. flavipes} were recorded in lowland areas where \textit{C. partellus} was the dominant borer species and low rates of parasitism were recorded in highland areas where \textit{B. fusca} was the predominant species. \textit{Cotesia flavipes} caused the highest parasitism (82\%) on \textit{C. partellus}. This result verified that \textit{Cot. flavipes} contributed to the reduction of \textit{C. partellus} population in lowlands, regardless of the zone, and its rate of parasitism varied between crop stages, crop types, elevations, host, and host stages. Findings of this study have particularly relevant information on the contribution of \textit{Cot. flavipes} to the population reduction of stem borers, time or stage of its occurrence in relation to host stages and crop stages, and its distribution in relation to the availability of a suitable host across each zone. In conclusion, this larval parasitoid plays an important role in reducing stem borer populations and can be used as one component of integrated stem borer management in northeastern Ethiopia.

Key words: Maize, sorghum, parasitoid, \textit{Chilo partellus}, \textit{Busseola fusca}, stemborer, stem borer

Assegid Assefa\textsuperscript{1} and *Tesfaye Abebe\textsuperscript{2}, 2011. Wild edible trees and shrubs in the semi-arid lowlands of Southern Ethiopia, \textit{Journal of Science and Development}, 1(1): 5-17
Academic Success Depends on Research and Publications

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Abstract: The study was conducted in Benna Tsemay district, South Omo Zone of the Southern Nations’, Nationalities’ and Peoples’ Region (SNNPR) of Ethiopia, to identify and document wild edible trees and shrubs and to assess their role in household food security. Ethno-botanical data were collected using a semi-structured questionnaire, key informant interview, group discussion and vegetation inventory. A total of 30 wild edible trees and shrubs were identified and documented, of which 15 species (50%) have a supplementary role in household food security, three species (10%) are used to fill the seasonal food shortage and 12 species (40%) have an emergency role. In addition to food, four species are used to generate income for households. The density of wild edible trees and shrubs varied with altitude, the average number being 25 trees or shrubs ha-1 in the lower altitudinal zones (500–600 m a.s.l.) and 312 in mid-altitudinal zones (1200–1500 m a.s.l.). The harvestable edible materials also varied from site to site, with average quantities of 85 and 382 kg ha-1 for the lowlands and mid-altitudinal zones, respectively. Expansion of agriculture (25%), fire hazards (21.7%) and overgrazing (18%) were the major threats to the existence of wild edible trees and shrubs in the study area. The study indicated that wild edible plants are valuable resources for improving food and nutritional security and income of households living in dryland areas. Thus, more research is needed to assess their nutritional value and economic as well as ecological contributions.

Key words: Ethno-botany, Food security, Indigenous knowledge, Benna, Tsemay, South Omo


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Abstract: Information regarding the effects of multipurpose tree species on soil conditions in Ethiopia is very scarce to be of use for improved agricultural productivity. The study was conducted on farmers’ fields at Umbulo Wacho watershed, which is located in the Hawassa Zuria woreda Sidama Zone of the Southern Ethiopia. The aims of the study were to identify the effects of scattered F. albida and C. macrostachyus tree species on the physico-chemical properties of soil fertility parameters and grain yield of maize within and outside the canopy of the tree and at varying soil depths. Soil samples were collected under the canopy of the two tree species and in the open cultivated land from three radiuses of 1.5m, 3.5m and 25m out of the trees within the 0-20cm and 20-40cm soil depths. The results of the study indicated that except for pH and C/N ratio the amount of soil nutrients under F.albida tree species were significantly (P ≤ 0.05) higher than the C. macrostachyus tree species and that of the open cultivated land. Generally, comparisons between under the canopy and outside the canopy of the two tree species indicated a highly significant difference on major soil fertility parameters. The effect of the two tree species on soil fertility parameters as well as grain yield of maize was significantly (P<0.05) higher within the canopy of the tree than outside of the canopy. The findings suggest that the maintenance of soil fertility and improvement in grain yield of maize by small-holder farmers can be attained by incorporation of the two tree species in agricultural landscapes of similar agroecological conditions.

Key words: Parkland Agroforestry, Productivity and Soil fertility Management, ‘Hawassa Zuria, Sidama Zone


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Abstract: Epidemics of powdery mildew due to *Leveillula taurica* is an increasing problem in pepper production areas of Ethiopia, particularly in the central rift valley part of the country. The current study was conducted with the major objective of identifying sources of resistance hosts against the powdery mildew diseases. A total of 17 pepper genotypes were evaluated in field experiments at two locations, Hawassa and Mareko. Starting seven days after transplanting, plants in each plot were monitored for diseases symptoms and infection. Data were collected on incidence and severity of powdery mildew. Besides the area under disease progress curve (AUDPC) were calculated. Yield components were also recorded after harvest. Powdery mildew disease and yield parameters differed significantly among the tested genotypes at both locations. The majority of the genotypes were moderately resistance to susceptible to *L. taurica*, none of the genotypes was found to be immune at both locations. Significant variations were also obtained among the genotypes for all yield components, namely dry fruit weight per plant, number of fruit per plant, pulp weight per plant, unmarketable fruits weight per plant, fruit length and single fruit weight. The identified sources of resistance can be utilized in future pepper breeding programs after further testing in multilocations.

Key words: *Leveillula taurica*, Host resistance, Pepper


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Abstract: A field experiment was conducted at Werer Agricultural Research Center, Afar region, Ethiopia, to determine the best insecticide rotation sequence and use of compatible mixtures in the Insecticide Resistance Management strategy for cotton aphid, *Aphis gossypii*. Randomized Complete Block design having eight treatment combinations and four replications were used. The parameter assessed were aphid population at pre and post insecticide application; and seed cotton yield. In this experiment, four round of spray application was made by using insecticides from different chemical class and their mixtures. Using the modified Abbott’s formula, the percent efficacy was computed. A highly significant difference (P< 0.001) was observed among the treatments for post spray counts. In most of the treatments made during the first round spray, the aphid population didn’t show a response to the insecticides applied. But starting the second round, the insecticides were able to express their potential in reducing aphid population. In most cases sole treatments were better than mixtures. However, the mixtures like endosulfan + carbosulfan and endosulfan + furathiocarb gave better control of aphid. As the effect of insecticide rotation, treatment 2 (Carbosulfan, Diafenthiuron, Furathiocarb and Deltamethrin), 3 (Dimethoate, Carbosulfan, Deltamethrin and Diafenthiuron) and 5 (Endosulfan, Endosulfan + Carbosulfan, Deltamethrin and Dimethoate) were the best alternative combinations of insecticide groups to be used in IRM strategy. Seed cotton yield was significantly different (P< 0.0001) among treatments. The highest seed cotton yield (29.84 q/ha) was recorded from treatment 5 (Endosulfan, Endosulfan* Carbosulfan, Deltamethrin and Dimethoate), followed by treatment 1(Endosulfan, Carbosulfan, Deltamethrin and Furathiocarb) and 7 (Furathiocarb Endosulfan * Furathiocarb, Deltamethrin and Dimethoate) and yielding 26.29 and 20.47 q/ha, respectively. These findings point to the fact that, alternative use of insecticides from different class and using insecticide mititures is the best option to manage insecticides resistance in cotton aphid.

Key words: Cotton aphid (Aphis gossypii), insecticide resistance management, Ethiopia.

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Abstract: Nitrogen is one of the most limiting nutrients to plant growth. It has to be fixed in the form of NH$_4$ through chemical (fertilizer production) and biological (bacterial) processes (BNF) in the soil. The endosymbiotic associations of root nodule bacteria (rhizobia) with leguminous plants fix 200-500 kg N ha$^{-1}$ yr$^{-1}$. Consequently, the legumes are integrated into different agro-ecosystems for plant production and soil protection. In view of the ever-increasing demand for food and feed for the burgeoning population in the country, the search for cheaper ways of enhancing soil fertility is very important. To that end, many research activities have been undertaken for the last 20 years to realize the full potential of the legume-rhizobia symbiosis in crop production and agro forestry systems. Although the pioneer research works were focused on the agronomic relationship of resident rhizobia with food legumes, recent studies encompassed rhizobial diversity and effectiveness on different pulse crops and other woody shrub and tree legumes. Some of the polyphasic studies on the rhizobia from Southern Ethiopia revealed that Ethiopian soils harbour diverse groups of rhizobia that are very distinct (more than 80%) from the hitherto known taxa of the Family Rhizobiaceae. This suggests that the country has enormous rhizobial resources for more phylogenetic studies and for the selection of elite strains to enhance effective Rhizobium-legume symbiosis in its agro ecosystems.

In this review, the challenges and prospects associated with the exploitation of BNF in the country, in general, and the potential to develop and promote broad-host range inoculants to small-scale farmers, in particular, will be discussed.

Key words/phrases: Genetic diversity; Indigenous rhizobia; Legume-Rhizobium symbiosis; Nitrogen fixation.


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Abstract: Nodulation, nitrogen fixation and growth in seedlings of a Senegalese provenance of Acacia nilotica subsp. tomentosa, inoculated with eight different Rhizobium strains isolated from various African Acacia species, were measured. The Rhizobium strains were markedly different in their ability to induce functional nodules suggesting, in view of previous reports of cross-inoculation studies, that strain specificity at subspecies and/or provenance level may occur in A. nilotica. Three strains isolated from Acacia species other than A. nilotica were non-invasive. Of two strains isolated from A. nilotica subsp. kraussiana, one strain induced formation of ineffective nodules, while the other induced formation of effective nodules displaying a mean acetylene reduction rate, on nodules from 10-week-old seedlings, of 57.7 mmol gy$^{-1}$ hy$^{-1}$. This is more than ten times higher than previously reported for an unspecified subspecies of A. nilotica in a field trial in India and compares favourably with results reported from other nitrogen-fixing tree species widely promoted for use in agroforestry such as Leucaena leucocephala. Three re-inoculated strains induced the formation of partially effective nodules. Seedlings with effective nodules had 50% larger dry mass and more than double the total nitrogen content of non-nitrogen fixing seedlings. Variability in total dry weight, nodule dry weight and total nitrogen content of effectively nodulated seedlings were high and strongly positively correlated $r$=0.88 to 0.99, indicating considerable potential to improve initial growth rates and nitrogen fixation in A. nilotica through selection.

Key words: Strain specificity, Nitrogen fixation, Tree growth, Multipurpose tree species


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Abstract: Growth variability and effect of seed size on growth of seedlings of Acacia nilotica ssp. tomentosa of a Senegalese provenance were studied in a greenhouse experiment. Seedlings were raised from a sample
of 52 seeds with a seed weight range of 0.070 g to 0.258 g; and a range of growth variables were measured on seedlings harvested 11 weeks after planting. Based on the sample mean and variance, the sample size required to estimate the parameter (mean) of the growth variables was determined. Seedlings showed a large variability in growth. There were five-fold and three-fold differences between seedlings in leaf area and total dry weight, respectively. Seed weight has little effect on seedling growth. The number of replications required to estimate a parameter mean of the different growth variables, within ±20% margin of error at \( P = 0.05 \), ranged from nine to 24. The observed growth variability was indicated to be an important biological variable which could be used to improve growth and yield in *A. nilotica*.

**Key words:** Biomass, provenance, sample size, seed size

*Endalkachew Wolde-meskel\(^1\,3\), Zewdu Terefework\(^2\), Åsa Frostega°rd\(^1\) and Kristina Lindstro°m\(^3\), 2005. Genetic diversity and phylogeny of rhizobia isolated from agroforestry legume species in Southern Ethiopia, *International Journal of Systematic and Evolutionary Microbiology*, 55: 1439-1452

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**Abstract:** The genetic diversity within 195 rhizobial strains isolated from root nodules of 18 agroforestry species (15 woody and three herbaceous legumes) growing in diverse ecoclimatic zones in southern Ethiopia was investigated by using PCR–RFLP of the ribosomal operon [16S rRNA gene, 23S rRNA gene and the internal transcribed spacer (ITS) region between the 16S rRNA and23S rRNA genes] and 16S rRNA gene partial sequence (800 and 1350 bp) analyses. All of the isolates and the 28 reference strains could be differentiated by using these methods. The size of the ITS varied among test strains (500–1300 bp), and 58 strains contained double copies. UPGMA dendrograms generated from cluster analyses of the 16S and 23S rRNA gene PCR–RFLP data were in good agreement, and the combined distance matrices delineated 87 genotypes, indicating considerable genetic diversity among the isolates. Furthermore, partial sequence analysis of 67 representative strains revealed 46 16S rRNA gene sequence types, among which 12 were 100% similar to those of previously described species and 34 were novel sequences with 94–99% similarity to those of recognized species. The phylogenetic analyses suggested that strains indigenous to Ethiopia belonged to the genera Agrobacterium, Bradyrhizobium, Mesorhizobium, Methylobacterium, Rhizobium and Sinorhizobium. Many of the rhizobia isolated from previously uninvestigated indigenous woody legumes had novel 16S rRNA gene sequences and were phylogenetically diverse. This study clearly shows that the characterization of symbionts of unexplored legumes growing in previously unexplored biogeographical areas will reveal additional diversity.


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**Abstract:** Eighty-seven rhizobial strains isolated from root nodules of field standing native and exotic woody legumes in southern Ethiopia were characterized using the Biolog method and AFLP fingerprinting technique. Cluster analysis of the metabolic and genomic fingerprints revealed 18 and 25 groups, respectively, demonstrating considerable diversity in rhizobial population indigenous to Ethiopian soils. While 25 strains (29%) were linked to members of Agrobacterium, Bradyrhizobium, Mesorhizobium, Rhizobium or Sinorhizobium, the bulk of the strains formed several distinct groups in both methods and did not relate to reference species included in the study. In contrast to exotic species which formed symbiosis with strains of only one specific genomic group, indigenous host species nodulated by metabolically and genically diverse groups. The results in this study support the view, that long-term association between the symbionts allows gradual differentiation and diversity in compatible rhizobial population resident in
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native soils. Lack of significant metabolic and genomic relatedness to the reference strains in our results suggested that test strains in our collection probably included ‘unique’ types, which belong to several yet undefined rhizobial species.

**Key words:** Indigenous rhizobia, diversity, native hosts, Biolog, AFLP, Ethiopia, *Albizia gummifera*, *Erythrina brucei*, *Millettia ferruginea*


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**Abstract:** The diversity of 110 rhizobial strains isolated from Acacia abyssinica, A. seyal, A. tortilis, Faidherbia albida, Sesbania sesban, Phaseolus vulgaris, and Vigna unguiculata grown in soils across diverse agro-ecological zones in southern Ethiopia was assessed using the Biologe system and amplified fragment length polymorphism (AFLP) fingerprinting technique. By cluster analysis of the metabolic and genomic fingerprints, the test strains were grouped into 13 Biolog and 11 AFLP clusters. Twenty-two strains in the Biolog method and 15 strains in the AFLP analysis were linked to eight and four reference species, respectively, out of the 28 included in the study. Most of the test strains (more than 80% of 110) were not related to any of the reference species by both methods. Forty-six test strains (42% of 110) were grouped into seven corresponding Biolog and AFLP clusters, suggesting that these groups represented the same strains, or in some cases clonal descendants of the same organisms. In contrast to the strains from S. sesban, isolates from Acacia spp. were represented in several Biolog and AFLP clusters indicating the promiscuous nature of the latter and widespread occurrence of compatible rhizobia in most of the soil sampling locations. The results showed that indigenous rhizobia nodulating native woody species in Ethiopian soils constituted metabolically and genomically diverse groups that are not linked to reference species.

**Key words:** African Acacia spp., Amplified fragment length polymorphism (AFLP), Biolog, Ethiopia, Rhizobial diversity, Sesbania sesban


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**Abstract:** The nodulation of provenances of Acacia seyal, Acacia tortilis and Faidherbia albida, and other indigenous multipurpose tree species were tested in 14 different soil samples collected from diverse agro-ecological zones in southern Ethiopia. Associated rhizobia were isolated from these and from excavated nodules of field standing mature trees, and phenotypically characterized. Indigenous rhizobia capable of eliciting nodules on at least one or more of the woody legume species tested were present in most of the soils. Tree species were markedly different in nodulation in the different site soils. Sesbania sesban and *Acacia abyssinica* showed higher nodulation ability across the different sites indicating widespread occurrence of compatible rhizobia in the soils. The nodulation patterns of the different provenances of Acacia spp. suggested the existence of intraspecific provenance variations in rhizobial affinity which can be exploited to improve N fixation through tree selection. Altogether, 241 isolates were recovered from the root nodules of trap host species and from excavated nodules. Isolates were differentiated by growth rate and
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colony morphology and there were very fast-, fast-, slow-, and very slow-growing rhizobia. The bulk of them (68.5%) were fast-growing acid-producing rhizobia while 25.3% were slow-growing alkali-producing types. Fast-growing alkali-producing (2.9%) and slow growing acid-producing strains (3.3%) were isolated from trap host species and excavated nodules, respectively. All isolates fell into four colony types: watery translucent, white translucent, dull glistening and milky (curdled) type. The diversity of indigenous rhizobia in growth rate and colony morphology suggested that the collection probably includes several rhizobial genera.

Key words: African Acacia spp., Rhizobia, Ethiopia, Provenance, Nodulation

*Gifole Gidago¹, Sheleme Beyene² and Waleign Worku², 2011. The response of haricot bean (Phaseolus vulgaris L.) to Phosphorus application on ultisols at Areka, Southern Ethiopia, Journal of Biology, Agriculture and Healthcare, 1(3) ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)

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Abstract: A field experiment was conducted at Areka Agricultural Research Center in Bolosso Sore Woreda, Wolaita Zone of Southern Nations Nationalities and People’s Regional State (SNNPRS) to evaluate the response of haricot bean (Phaseolus vulgaris L.) to P fertilizer. Seven levels of P (0, 10, 20, 30, 40, 50 and 60 kg ha-1) in RCBD with four replications were used in the study. Recommended rate of N (60 kg ha-1) was applied to all treatments. The full doses of P and N were applied at sowing. Data on crop phenology, growth parameters, grain yield and yield components, and total biomass were recorded during specific physiological stages of the crop. At harvest, the plants were partitioned into grain and straw to determine total P uptake, apparent recovery and nutrient use efficiency by crops. The effect of P was significant in hastening physiological maturity of crop, whereas its effect was not significant on flowering and growth parameters such as plant height and number of branches plant-1. Although the effect of P application was not significant on number of pods plant-1, number of seeds pod-1, thousand seed weight and straw P content, its application had significantly increased grain yield. The grain yield ranged between 15.58 dt ha-1 at 0 kg P ha-1 (control) and 25.47 dt ha-1 at application of 40 kg P ha-1. The levels of P application did not affect available P, total N, OC contents and EA of soil. The highest total P uptake (32.59 kg ha-1) was obtained at 30 kg P ha-1 and increased with increasing rates of P application, whereas apparent P recovery was found to be highest at 20 kg P ha-1. Both agronomic and physiological P use efficiencies of the crop were highest at the rate of 10 kg P ha-1. Therefore, application of 10 kg P ha-1 is recommended for better haricot bean production at Areka.

Key words: Phosphorus, Haricot bean, Areka

*Girma Abera¹, Endalkachew Wolde-meskel¹ and Lars R. Bakken², 2013. Effect of organic residue amendments and soil moisture on N mineralization, maize (Zea mays L.) dry biomass and nutrient concentration, Archives of Agronomy and Soil Science, 59 (9): 1263-1277

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Abstract: Greenhouse pot experiments using four tropical soils were conducted to measure the effect of crop residues on nitrogen mineralization/immobilization and the growth of maize plants under two soil moisture regimes (pF2.5 and pF3.5). Nitrogen-rich residues of pigeon pea [PP, Cajanus cajan (L.) Millps, C/N, 18.8] enhanced plant growth and increased the assimilation of mineral elements (N, P and K) at both moisture regimes. Less nitrogen-rich residues of haricot beans [HB, Phaseolus vulgaris (L.), C/N, 28.9] had a slightly negative effect on plant growth and the assimilation of mineral elements, and a stronger negative effect was recorded for the most N-poor plant residue, maize [M, Zea mays (L.), C/N, 33.6]. For PP, we estimated the recovery of residue-nutrients in maize plants (net increase in N, P and K assimilation due to PP incorporation) as 19% for N, 88% for P and 86% for K in the high-moisture regime (pF2.5). The equivalent
values for the drought-stress regime (pF3.5) were 10, 34 and 38%, respectively. The results demonstrate the immediate enhancement of plant growth by plant residues with a low C/N ratio, even under drought-stress conditions.

Key words: Biomass, C/N ratio, nutrient concentration, residue quality, soil moisture

*Girma Abera*¹,², Endalkachew Wolde-Meske² and Lars R. Bakken¹, 2013. Unexpected high decomposition of legume residues in dry season soils from tropical coffee plantations and crop lands, *Agron. Sustain. Dev.*, 34: 667-676

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**Abstract:** Crop residues are essential fertilizer source of low-input farming systems in Sub-Saharan Africa. However, crop residues provide nutrients only if they decompose in the soil. Decomposition is assumed to be very low during the dry season due to the scarcity of water, but there are few quantitative knowledge on decomposition under such conditions. Therefore, we studied the decomposition of legume residues, haricot bean (*Phaseolus vulgaris* L.), and pigeon pea (*Cajanus cajan* L. (Millps) using litterbag experiments in two coffee and two crop land agroecosystems of southern Ethiopia. The residues were surface applied and subsoil buried under irrigated and non-irrigated conditions and were then retrieved after 30–180 days. We measured mass loss, decay rate constant (k), and C and N concentrations. Results demonstrate an unexpected high decomposition in seasonal dry soils, even when the litterbags were placed on the soil surface. Interestingly, 89% of the initial N of pigeon pea and 85% of haricot bean were released after 150 days, on the average. Thus microbial decomposition is unexpectedly high during the dry season. This finding has implications for the effect of plant residues on the supply of mineral N to crops growing during subsequent wet season.

Key words: Dry season, Legume residue, Mass loss, Nitrogen release, Residue placement, Soil moisture


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**Abstract:** This study was conducted to assess nitrogen (N) mineralization from Soil Organic Matter (SOM) in situ and in laboratory incubation under different soil moisture regimes. Andosol soils were sampled from coffee (CF) and crop (CP) land uses of southern Ethiopia. Extractable NO₃--N and mineral N were strongly increased, while NH₄+-N declined in response to soil moisture increase (from air dry to 100% FC, field capacity) during laboratory incubation. In situ extractable NO₃--N and mineral N were strikingly low in December (dry) with both CF and CP. However, they were consistently greater during March to August due to more rain flushes, suggesting better N release during cropping season. Increasing soil moisture from air dry to 100% FG enhanced extractable NO₃--N and mineral N of CF by 95.7 and 81.7%, respectively, while that of CP was increased by 58.7 and 46.4% respectively. By contrast, extractable NH₄+-N declined by 82.9% with CF and by 87.0% with CP. The assessment of N mineralization in relation with soil moisture showed consistent trends both under in situ and laboratory methods. Indeed, the N mineralization of CF was about double to that of CP at 75-100% FC and during July-August (wet season). In contrast, average in situ N mineralization of CP was greater than CF, attributed to longer history of annual inputs of N-fertilizer and might be because of absence of actively competing plants with soil microorganisms. Generally, the knowledge of annual patterns of N mineralization in relation with soil moisture is necessary to synchronize crop N demands with plant-available N in the soil.

Key words: Drought stress, land use, microbial activity, Nitrification, soil pH, wet season

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Abstract: Land use effect of tropical Andosol, with two from crop lands (Site 1 and Site 2) and one from Agroforestry coffee plantation (Site 3) was explored under laboratory conditions to understand their physical, chemical and biological properties and soil organic carbon (SOC) stocks from the rift valley of Ethiopia. Site 3 that acquired less cultivation than others exhibited better aggregate size fraction (AF, 55%), higher aggregate stability (AS, 91%), and greater active microbial biomass (AMB), reflecting better soil structure development. Comparatively, higher total carbon (TC), organic carbon (OC) and total nitrogen (TN) concentrations were recorded in bulk soils and microaggregate fractions of Site 2 and Site 3 than in intensively cultivated Site 1. As expected, microaggregate fractions displayed greater OC and TN than bulk soils across all land uses. Site 1 revealed higher metabolic quotient (qCO2) and lower SOC stock (2.1 Mg·ha$^{-1}$), suggesting microbial stress, while micro nutrients deficiencies were observed with the alkaline soil (Site 2). Conversely, the highest SOC stock was exhibited with Site 3 (4.2 Mg·ha$^{-1}$), indicating the importance of coffee land use in C sequestration. Crop lands, depleted much of their native carbon stocks had significant CO2 sink capacity. Hence, management practices that increase the input of organic resources should be adopted to build SOM and enhance soil fertility.

Key words: Aggregate Fraction, Aggregation stability, Crop land use, Coffee land use, SOC and SON Stocks


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Abstract: Seasonal drought in tropical agroecosystems may affect C and N mineralization of organic residues. To understand this effect, C and N mineralization dynamics in three tropical soils (Af, An$_1$, and An$_2$) amended with haricot bean (HB; *Phaseolus vulgaris* L.) and pigeon pea (PP; *Cajanus cajan* L.) residues (each at 5 mg g$^{-1}$ dry soil) at two contrasting soil moisture contents (pF2.5 and pF3.9) were investigated under laboratory incubation for 100–135 days. The legume residues markedly enhanced the net cumulative CO$_2$–C flux and its rate throughout the incubation period. The cumulative CO$_2$–C fluxes and their rates were lower at pF3.9 than at pF2.5 with control soils and also relatively lower with HB-treated than PP-treated soil samples. After 100 days of incubation, 32–42% of the amended C of residues was recovered as CO$_2$–C. In one of the three soils (An1), the results revealed that the decomposition of the recalcitrant fraction was more inhibited by drought stress than easily degradable fraction, suggesting further studies of moisture stress and litter quality interactions. Significantly (p<0.05) greater NH$_4^+$–N and NO$_3^−$–N were produced with PP-treated (C/N ratio, 20.4) than HB-treated (C/N ratio, 40.6) soil samples. Greater net N mineralization or lower immobilization was displayed at pF2.5 than at pF3.9 with all soil samples. Strikingly, N was immobilized equivocally in both NH$_4^+$–N and NO$_3^−$–N forms, challenging the paradigm that ammonium is the preferred N source for microorganisms. The results strongly exhibited altered C/N stoichiometry due to drought stress substantially affecting the active microbial functional groups, fungi being dominant over bacteria. Interestingly, the results showed that legume residues can be potential fertilizer sources for nutrient-depleted tropical soils. In addition, application of plant residue can help to counter the N loss caused by leaching. It can also synchronize crop N uptake and N release from soil by utilizing microbes as an ephemeral nutrient pool during the early crop growth period.

Key words: CO$_2$–C flux, Labile pool, Legume residues, Litter quality, N immobilization, N mineralization, Moisture stress

Abstract: Late blight caused by *Phytophthora infestans*, is one of the most significant constraints to potato production in Ethiopia and other regions of the world. Fungicides and host plant resistance are among the most efficient control options available to growers. Field trials were conducted in 2010, in Hawassa and Shashemene, Southern Ethiopia to evaluate the effectiveness of fungicide application regimes on four potato varieties. A factorial experiment with four types of fungicide applications (Ridomil, Pencozeb, Chlorothanoin, and no spray) in weekly intervals, and four potato varieties having different level of resistance were established. Late blight infection was prevalent in the experiment year, and a significant amount of disease was detected ($P<0.05$). Application of fungicide treatments considerably reduced late blight progress, with a corresponding increase in tuber yields. Based on late blight disease occurrence, application of Ridomil MZ 63.5% WP fungicide reduced disease development and increased tuber yield in all varieties as compared to the other two fungicides.

Key words: Fungicide, Host resistance, Late blight, *Solanum tuberosum*


Abstract: The aim of this study was to examine the effects of planting density and inter-row spacing on cowpea (*Vigna unguiculata* L. Walp.) productivity at two contrasting moisture regimes. A field experiment was conducted under controlled moisture conditions during the 2007 off-season, at Hawassa University, College of Agriculture, Southern Ethiopia. Treatments were made from a factorial combination of four densities (71428, 95238, 133333 and 200000 plants ha$^{-1}$), two inter-row spacings (50 and 70 cm) and two levels of water regimes (well watered and dry). The experiment was laid out in a split- split plot design and had three replications with watering regime, inter-row spacing and planting density as main plot, sub-plot and sub-sub-plot factors, respectively. Grain yield and all yield attributes, total biomass and harvest index were decreased by water limitation while none of those traits were significantly affected by inter-row spacing. Moisture $\times$ planting density interaction was significant for grain yield ha$^{-1}$, number of pods m$^{-2}$ and total biomass ha$^{-1}$. The interaction indicated that an increase in both grain and total biomass yield ha$^{-1}$ was observed with increasing planting density under the wet regime. Grain yield plateau was reached at a density of 160000 plants ha$^{-1}$ under the wet regime. On the other hand, an increase in planting density decreased grain yield and total biomass ha$^{-1}$ under the water-limited condition with the highest yield at the lowest density of 71428 plants ha$^{-1}$. Thus, farmers could get more out of cowpea by matching their planting density with available moisture. The two inter-row spacings can be used interchangeably by choosing whichever is convenient for management.

Key words: Cowpea, spacing, planting density, moisture regime, yield, yield component


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**Abstract:** Four released durum wheat varieties, two medium tall (Arsi-Robe and Kilinto) and two recently released semi-dwarfs (Ude and Yerer) were evaluated under five different N rates (0, 60, 120, 180 and 240 kg·ha\(^{-1}\)) in 2005/06 growing season at Akaki and Debre Zeit, central Ethiopia. The quality responses of durum wheat varieties to different N-fertilizer rates and the N responses between tall and short durum wheat varieties were assessed. Protein and gluten content, vitreous kernel count, thousand kernel weight, test weight and lodging were considered. Vitreous kernel count, protein and gluten content were higher at Debre Zeit than at Akaki. Unlike Debre Zeit, there were significant relationships between response variables and fertilizer levels at Akaki. Lodging slightly affected the medium tall varieties at Debre Zeit whereas it was not a problem at Akaki. At Akaki, varieties response to each additional N rate was entirely below the quality standard set by ICC, 2000 except for thousand kernel weight. Therefore, it is unwise to promote durum wheat scaling up/out program for quality production at Akaki.

**Keywords:** Gluten Content, N-Fertilization, Protein Content, Thousand Kernel Weight, Test Weight, Vitreous Kernel Count


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**Abstract:** The production of groundnut is constrained by several factors among which Aspergillus spp. are the one. In addition to causing quantitative losses, Aspergillus spp. produce highly toxic and carcinogenic chemical substances known as aflatoxins. This study was conducted with the objectives to (i) identify Aspergillus species associated with groundnuts, (ii) determine the frequency of seed contamination, and (iii) survey agro-ecological conditions related to groundnut contamination by Aspergillus spp. About 270 groundnut samples were collected from farmers’ storage, fields and local markets of three districts i.e. Babile, Darolabu and Gursum of eastern Ethiopia for mycological analysis in the year 2010. Results of the mycological analysis suggested heavy infestation of groundnut samples by various molds including A. niger group, A. flavus, A. ochraceus group, A. parasiticus and Penicillium species. At the district level, the incidence of infected groundnut kernels ranged from 50 to 80 %. Within the district kernel infection varied between 36.3% and 100%. The common Aspergillus symptoms (yellowing or chlorotic leaves, wilting, drying and brown or black mass covered by yellow or greenish spores) were also observed in groundnut fields. The current results were consistent with our earlier report of heavy aflatoxin contamination of groundnut from the same places. In addition, the high incidence of A. niger group indicates the potential contamination of groundnut by other toxins including ochratoxin A and fumonisins. This suggests the urgent need to apply control measures against toxigenic fungi and associated mycotoxins.

**Key words:** Aspergillus spp., groundnut, Penicillium spp., Ethiopia.

*Prameela Devi T\(^1\), Prabhakaran N\(^1\), Kamil D\(^1\), Borah J.L\(^1\) and Alemayehu Getachew\(^2\), 2013. Development of SCAR marker for specific detection of Aspergillus flavus. *African Journal of Microbiology Research* 7(9): 783-790

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**Abstract:** *Aspergillus flavus* is the causal agent of corns and peanuts mold known to produce aflatoxin. A quick and reliable PCR-based diagnostic assay has been developed to detect *A. flavus* using a fungus-specific marker derived from genomic DNA. An amplified RAPD product of 600 bp obtained in *A. flavus* isolates using a random primer OPB-11 was cloned in pGEMT easy vector and sequenced. Based on sequences, six primers were designed, out of which a primer pair Asp f1 (CCCGTGAAGTTGCCCAGGT) and Asp r2 (GTCGTTTGGTGAGTGGGAA) amplified a sequence of 490 bp which was specific to *A. flavus*. The
specificity of the marker when tested against 31 isolates of *Aspergillus flavus*, 7 isolates of *Aspergillus clavatus*, 4 each isolates of *Aspergillus terreus*, *Aspergillus oryaze*, *Aspergillus tamari*, 1 each isolate of *A. parasiticus* and *A. kambarensis* and 4 isolates of 2 different *Cheatomium* species, 5 isolates of 3 different *Trichoderma* species and 5 isolates of 5 different *Fusarium* species showed a specific band of 600 bp only in *A. flavus*. With the optimized PCR parameters, this sequence characterized amplified region (SCAR) marker was sensitive and could detect small quantities of *A. flavus* DNA as low as 10 to 25 ng with high efficiency. This marker could also clearly distinguish *A. flavus* from other fungal plant pathogens, including different *Aspergillus* spp. The utilization of this diagnostic PCR assay in analysis of post harvest samples will be a strong step towards aflatoxin detection in animal feed and export commodity.

**Key words**: Aspergillus flavus, OPB11, random amplified polymorphic DNA (RAPD), sequence characterized amplified region (SCAR) marker


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**Abstract**: Households in much of the tropics depend for their livelihoods on the variety and continued production of food and other products that are provided by their own farms. In such systems, maintenance of agrobiodiversity and ensuring food security are important for the well being of the population. The enset-coffee agroforestry homegardens of Southern Ethiopia that are dominated by two native perennial crops, Coffee (*Coffea arabica* L.) and Enset (*Enset ventricosum* Welw. Cheesman), are examples of such agricultural systems. This study was conducted in Sidama administrative zone of Southern Ethiopia to determine the factors that influence the diversity and composition of crops in the systems. Data were collected from 144 sample homegardens selected from four districts. Stepwise multiple regression analysis was used to relate indices of crop diversity and area share of major crops with the physical and socioeconomic factors. The study revealed that socioeconomic factors, mainly proximity to markets, affected negatively crop species richness. The production area of the main crops enset and coffee decreased with increasing proximity to market and road while that of maize and khat increased. At household level, farm size had a significant effect on area share of enset and coffee. As farm size increased the share of the cash crop, coffee increased but that of the staple, enset declined. Enset, which is the backbone of the system in terms of food security, is declining on small farms and the share of monoculture maize system is increasing. The trend towards declining agrobiodiversity, and reduction in the production area of the main perennial crops and their gradual replacement with monoculture fields could make the systems liable to instability and collapse. As these sites are high potential agricultural areas, intensification can be achieved by integrating high-value and more productive crops, such as fruits, spices and vegetables, while maintaining the integrated and complex nature of the systems.

**Key words**: Agroforestry systems, coffee, crop diversity, Enset, homegardens, Sidama


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**Abstract**: Diversity of trees and shrubs in agricultural systems contributes to provision of wood and non-wood products, and protects the environment, thereby, enhancing socioeconomic and ecological sustainability of the systems. This study characterizes the diversity, density and composition of trees in the agroforestry
homegardens of Sidama Zone, Southern Ethiopia, and analyses physical and socioeconomic factors influencing diversity and composition of trees in the systems. A total of 144 homegardens were surveyed from 12 sites. In total, 120 species of trees and shrubs were recorded of which, 74.2% were native to the area. The mean number of tree species per farm was 21. Density of trees varied between sites with mean values ranging from 86 to 1,082, and the overall average was 475 trees ha-1. Four different crop-based enset (Enset ventricosum (Welw.) Cheesman)-coffee homegarden types were recognized and they differed not only in the composition of major crops but also in the diversity, density and composition of trees. The composition, diversity and density of trees is influenced by physical and socioeconomic factors. The major physical factors were geographical distance between sites and differences in altitude of farms. The most important socioeconomic factors were farm size and access to roads. Tree species richness and density increased with farm size. Increased road access facilitated marketing opportunities to agricultural products including trees, and lead to a decline in the basic components of the system, enset, coffee and trees. In the road-access sites, the native trees have also been largely replaced with fast growing exotic species, mainly eucalypts. The decrease in diversity of trees and perennial components of the system, and its gradual replacement with new cash and annual food crops could jeopardize the integrity and complexity of the system, which has been responsible for its sustenance.

Key words: Determinants of on-farm tree diversity, Enset-coffee homegardens, On-farm density of trees, Landuse changes, Sidama Zone


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Abstract: In many tropical countries homegardens sustain large numbers of people. Households depend for their livelihoods on the variety and continued production of food and other products that are provided by their own gardens. Such homegardens combine production with the maintenance of biodiversity. Long-term sustainability of the system is crucial for the long-term wellbeing of the population, including food security. The enset-coffee system of Southern Ethiopia is an example of such agroforestry homegardens. Enset is the main food crop and coffee is the main cash crop. We analysed the homegardens of 144 households covering a range of geographical conditions. Household wealth status was the main determinant of homegarden size. In total, 198 species of cultivated crops (78) and trees (120) were found. Enset and crops were represented by 42 and 24 cultivars respectively. The homegardens were covered by around one-third of enset and one-third of coffee. Enset provides the backbone of the system as it provides food security. Our results show that the stability of the system depends both on its diversity and on the specific characteristics of the two main crops, enset and coffee. The enset-coffee homegardens are changing as farmers increasingly make individual choices and respond to emerging challenges and opportunities. The dynamics of the agroforestry homegarden of Southern Ethiopia can be considered as a productive bricolage process on the micro scale.

Key words: Coffee, Enset ventricosum, Ethiopia, livelihood, agricultural intensification


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Abstract: A key assumption in many homegarden studies is that homegardens are ecologically and socio-economically sustainable due to their species diversity. The precise relation between diversity and sustainability is still heavily debated, however. A basic question is how diversity in homegardens can best be
characterized in view of the various dimensions of species diversity and their variation in time and space. This paper assesses different types of species diversity in the homegardens of Sidama region of southern Ethiopia. In a survey of crop species in 144 homegardens a total of 78 cultivated crop species (excluding trees) belonging to 10 functional groups were recorded; there were on average 16 crop species and 8 functional groups per farm. Within homegardens, plots differ in species composition and crop diversity. Four types of homegarden systems are distinguished differing in both type and area-share of dominant species, relative orientation at subsistence or cash production and overall crop diversity. The gradual replacement of enset by maize and of coffee by more financially attractive cash crops khat and pineapple causes a decrease in overall crop diversity. Our data demonstrate that it is incorrect to consider homegardens as generic systems with a uniform distribution of species diversity: important within and between homegarden variation exists. Ecological and socio-economic sustainability is not just related to species diversity per se, but rather to more specific features such as presence of keystone species and diversity in functional species groups. Socioeconomic sustainability in terms of adjustment to socio-economic change implies dynamics in species diversity.

**Key words:** Homegarden dynamics, Functional groups, Keystone species, Enset/coffee gardens, Species diversity


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**Abstract:** Most homegarden studies have focused on Asia, where homegardens constitute a component of a spatially separated farming system consisting of cultivated fields with staple and/or commercial crops away from homes complemented by the homegardens with supplementary crops such as fruits and vegetables surrounding residential houses. In the highlands of East and Central Africa, another type of homegarden is found in the form of an integrated farming system within itself and without additional cultivated fields. In these ‘integral’ homegardens, not only supplemental crops such as fruits and vegetables, but also staple food crops and cash crops are grown. The enset (*Enset ventricosum*) and coffee (*Coffea arabica*) homegarden system in Southern Ethiopia is a typical example of such integral homegardens. An assessment of 144 of these homegardens was made to gain insights into their structure and vegetation composition and the relation between composition and geographic and socioeconomic factors. Four specific garden types are identified, which vary in commercial crop composition and diversity. These variations are related to farm size, access to roads and markets, and illustrate the dynamic character of homegardens. Overall, the diversity of the integral homegarden systems seems to be lower than that of the ‘complementary’ homegarden systems in Asia, probably due to the inclusion of light demanding staple food crops and relatively large number of commercial crops. The dynamic pathways of the integral homegarden systems because of commercialization appear similar to reported trends in the ‘complementary’ homegarden systems in Asia. Although the composition of the homegardens is influenced by socioeconomic dynamics, overall the Ethiopian homegardens can be characterized as being ecologically and socioeconomically sustainable. This can be attributed not only to species diversity but also to the presence of two keystone species-enset and coffee.

**Key words:** Adaptability, Socioeconomic change, Species composition, Sustainability.


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**Executive Summary:** The Sidama people of Southern Ethiopia manage trees intensively in their farming systems, but little attempt is made to systematically describe and analyse the various characteristics of these indigenous tree management and utilization methods. This study was carried out to understand and analyse
the ways in which the Sidama people manage and utilize tree resources. The survey was carried out on 60 randomly selected households, from four Kebeles in Dale and Aleta Wondo districts of Sidama zone. Data were collected using structured interviews, measurements and focus group discussions. The study revealed that farmers in Sidama grow diverse species of trees in different planting arrangements, namely sparsely scattered in farm fields, multistorey homegardens, farm boundaries, live fences and woodlots. The average density of trees was 1500 individuals ha$^{-1}$, but it varied widely with planting locations: Trees scattered in crop fields have low density of 40-60 trees ha$^{-1}$, while woodlots and boundary plantings have high density of 2,000 to 20,000 individuals ha$^{-1}$. Scattered trees are deliberately kept in low density and managed intensively to minimize their negative effects on associated crops. On the other hand, the eucalypts-dominated woodlots and boundary plantings are aimed at maximizing biomass production. Among the trees, the native species *Cordia africana* and *Millettia ferruginea* are found in all sample farms being grown inside crop fields. They are complimentary to crop production since they serve as shade to understorey crops and improve soil fertility. The other most common species include, *Afrocarpus falcatus*, *Persea americana* and *Eucalyptus spp*. The latter is increasingly becoming a popular cash crop among farmers in the region. Farmers use different tree management practices to promote growth of trees. These practices include, propagation, protection and maintenance, interface management and utilization. Tree propagation is often done by means of natural regeneration and the planting of wildlings. This is particularly true to the indigenous species that are mostly difficult to raise from seedlings. Trees such as *Erythrina abyssinica*, *Euphorbia candelabrum* and *Arundinaria alpina* are reproduced from cuttings. On the other hand, most of the exotic species are reproduced from seedlings. Many farmers produce seedlings of eucalyptus for planting and for sale. Farmers also protect and maintain trees during their growing period: Weeding, and pruning of dry branches are the commonest practices in this regard. However, practices of fencing around seedlings and saplings are also carried out for more valuable species such as *A. falcatus* and avocado. Depending on the nature of the species, they also apply common tree management practices such as coppicing, pollarding, lopping and pruning. These practices often have multiple purposes. These include, reduction of competition from neighboring crops, and provision of wood and fodder. The farmers use different tree parts: the root and bark are often used for medical purposes, leaves are used for fodder and medical purposes. The wood is used for housing construction, fencing, making of farm implements and tools, household utensils, etc. The trees used for such purposes are selected on the basis of their quality (such as durability, density, termite resistance, and luster) to meet the qualities required for the end product. High value native trees are often pollarded or lopped and not wholly harvested. They are felled only when farmers are in need of some cash, or when they need wood for construction purposes. This demonstrates that the farmers have a rational way of utilizing the trees and tree products. Sidama farmers also have a profound understanding of the ecological benefits of trees. Most of the trees that are dispersed in their farms are kept for their contribution to agriculture. The clearly identify the species that contribute to soil and water conservation, provision of shade, and soil fertility improvement, and maintain them in the appropriate niches in the farms. The increasing shortage of wood in urban areas is motivating the farmers to grow trees as cash crop. Many farmers grow eucalyptus for the purpose of income generation. Its adaptation to the locality, low labor requirement, profitability as well as the presence of road infrastructure for transportation has made it the most preferred species by the farmers. Generally, there are well-founded tree management and utilization practices in Sidama which are both ecologically sustainable and acceptable within the exiting socio-economic context. External intervention in tree planting and management activities is low, and wherever such attempts were made, they didn’t aim at enhancing the traditional tree management strategies and they focused on exotic species. It is therefore advisable that, any intervening organization should device strategies on how to strengthen these local tree management initiatives. This might give us a wider scope for intensifying tree growing in the area to meet the demands of the future generation.


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**Executive summary:** Agricultural colleges produce middle level manpower who work as frontline extension staff engaged in the dissemination of agricultural knowledge and skills, including soil conservation and agroforestry, to small-scale farmers. To ensure the supply of graduates that are competent in soil
conservation and agroforestry principles and practices it is necessary to include recent aspects of these subjects in the syllabus. This study was therefore conducted to make inventory and analysis of the curricula and teaching aspects of agroforestry and soil conservation subjects at sample agricultural colleges in Eastern Africa and make recommendations for improvement. Five sample colleges, one from each RSCU member countries, namely Egerton University (Kenya), Jimma College of Agriculture (Ethiopia), MoA Training Institute-Ukiriguru (Tanzania), Bukalasa Agricultural College (Uganda) and Natural Resources Development College (Zambia) were visited during the months of April and March, 1994. After collection of data from the sample colleges, a preliminary report was produced and this was discussed in a workshop composed of participants from the sample and other colleges, as well as the Extension departments of the Ministries of Agriculture in the respective countries. The main findings regarding the curricula and delivery of the subjects were: Agroforestry: Agroforestry education is gaining firm ground in the curricula due to the interest shown by the colleges and also the support provided by the African Network for Agroforestry Education (ANAFE) and ICRAF. The content of this subject in most of the colleges is based on ICRAF’s Agroforestry model course and most of the teaching staff have participated in ICRAF’s training courses. However, ANAFE has not reached all institutions in the region and attempts should be made to introduce Agroforestry education in the curricula of institutions that have not yet started teaching the subject, such as Jimma college of Agriculture. Land Husbandry: Soil and water conservation education in the sample colleges emphasizes on physical conservation methods and there is a clear lack of attention to biological and socio-economic aspects. It was recommended that soil and water conservation should be approached from a broad perspective taking into account the whole agricultural enterprise, soil and water conservation being an integrated part of the entire farming activity and farmers’ agricultural practices. The term, “Land Husbandry” was considered an appropriate title for such an approach. A model curriculum, for a Land Husbandry course, was developed to serve for diploma level education in agricultural colleges. This curriculum may be used to replace or to complement the existing conventional soil and water conservation curricula. In most of the colleges the introduction of a new course into the existing curriculum is a cumbersome business. The change has to be approved at a high level, in a curriculum review, which takes place only every second year. New resources have to be set aside for the course, etc. So rather than introducing a new ‘Land Husbandry’ course it would, at least initially, be appropriate to include parts of its suggested content in Soil and Water conservation courses. Training of the teaching staff on the principles and practices of Agroforestry and Land husbandry is a crucial element that needs to be given attention. Teaching materials, for use in extension, are available in most of the countries visited. They are produced by ICRAF, RSCU, national ministries, donor supported projects, etc. Thus emphasis should be given to the distribution of such materials to the colleges. Field practical should be a major part of the training at technical level. Due to lack of resources and large class size, practical education is weak in most of the colleges. In this respect, the colleges can be supported, if possible through increased resources, but also by assisting lecturers to develop practicals more adapted to the new situation.

Institutional Links
The field study as well as the recommendations from the workshop emphasized the importance of institutional linkage at all levels, for the continuous development of land husbandry courses. Linkages between colleges and international or regional organizations, such as ICRAF and RSCU, are important sources of technical backstopping and additional resources, teaching materials etc. The links with the national soil and water conservation programmers is essential to provide contact with farmers and to make sure the syllabi tally with national policies. Linkages between the colleges are important at national level to foster an multidisciplinary exchange, and at an international level to facilitate exchange of staff and information. A joint land husbandry committee at national level was suggested as a means to strengthen the contact within the countries. To facilitate exchange between colleges at an international level a database of staff and resources would be useful. ICRAF has developed a similar database for agroforestry teaching, that could easily be expanded to include land husbandry. International and regional organizations such as RSCU and ICRAF have a responsibility to include teaching staff from the technical institutions in their training activities.


Summary: Awassa College of Agriculture (ACA), located in the city of Awassa, 275 kms south of Addis Ababa, is one of the leading centres of agricultural education and research in Ethiopia. The three major objectives of the college are 1) to produce middle-and high-level personnel in agricultural sciences, 2) to advance basic, applied and adaptive research in the areas of agriculture and natural resources, and 3) to promote extension and consultancy services. As regards to the first objective, the college runs five diploma and three degree programs in five different areas of specializations. Since its establishment in 1976, the college has produced more than 5000 agricultural professionals at diploma and BSc degree levels. The college also offers various training courses to government and non-government organizations. ACA staff have been active in undertaking problem-solving research that can contribute to the development of sustainable agriculture in the country. Most of the research projects have produced useful outcomes that can be extended to users. At present, the college runs 36 research projects in the areas of agriculture, home science and natural resources. Recently established was the extension unit to strengthen research and extension linkage and to promote extension services to farmers and other users. ACA collaborates with various educational, research and development organizations at national and international levels. Land husbandry, which refers to the care, management and improvement of land resources, is a new approach in the college, superseding the term ‘soil conservation’. It recognizes that achieving food security and alleviating land degradation can be realized through proper land management that aims at improved and sustainable production. The term, therefore, encompasses different land management practices, which in the traditional sense have other names. ACA has been offering courses in soil and water conservation, soil fertility and management, soils and water management, agroforestry, and rangeland management, all of which reflect contents and principles of Land husbandry. The courses are offered in the different departments. Similarly, land husbandry related researches have been undertaken in the college. Currently, there are four agroforestry and agronomic research projects that aim at land management/husbandry. ACA has, therefore, been involved in land husbandry education and research, although the term has not been stated explicitly. Since the problems of food and wood production and environmental degradation can be tackled only in holistic manner, it is necessary to link and coordinate the teaching and research efforts of the different departments under the theme of Land husbandry. Coordinating such efforts at regional and national levels is also of paramount importance to facilitate exchange of information and expertise, for effective use of resources, and to avoid duplication of efforts.


Abstract: Growth performances of some multipurpose trees and shrubs have been studied for five years at two locations in the semi-arid areas of southern Ethiopia. The best performance in terms of rates of survival and growth rates (height and diameter growth) has been attained by Acacia nilotica, A.Cyanophylla, A.seyal, Cassia siamea and Prosopis julifora. Given the ecological limitations of semi-arid areas, growth rates of these species is promising and this indicates that sustainable production system can be realized using proper agroforestry technologies in the semi-arid areas of Southern Ethiopia and similar area types elsewhere.

Keywords: Agroforestry, growth rates, multipurpose trees and shrubs, semi-arid areas, Southern Ethiopia


Abstract: Grevillea robusta and other multipurpose tree species were planted at five locations representative of different agro-ecological zones of southern Ethiopia. Growth rates of the different species were studied for 48-57 months. Best height and diameter growth of G. robusta (1.88 m year\(^{-1}\), 2.05 cm year\(^{-1}\)) was attained in the semi-arid lowlands (1200 m elevation) while the lowest (0.62 m year\(^{-1}\), 0.69 cm year\(^{-1}\)) was in the cool highlands (2450 m elevation). Survival rates of G. robusta have been greater than the overall average survival rates of the different species at all sites.
Academic Success Depends on Research and Publications


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Abstract: Establishing a reliable phosphorus (P) supply is essential for assuring long-term sustainable food security. Not only are the world’s supplies of minable P running out, but the quality of the existing phosphate rock, which is the source of P fertilizers in modern agriculture, is also rapidly decreasing, as a result of which the cost of production is increasing. With more than one billion people - one sixth of the world’s population - suffering from chronic hunger, acquiring enough P to grow food will be a significant challenge for humanity in the future. The aim of this study was to evaluate the effectiveness of coffee wastewater for acidifying animal bones (a waste material from abattoirs or home-based slaughtering) to increase P release/availability for growing plants. We conducted an experiment where maize (Zea mays L.) and haricot bean (Phaseolus vulgaris) were grown in a greenhouse pot trial utilizing clay and loam soils (0-15 cm depth) collected from farmers’ field in southern Ethiopia. Soils were amended with different bone-based fertilizers (coarsely-ground and finely-ground with and without coffee wastewater acidification) and compared with soils fertilized with di-ammonium phosphate (DAP). Bone-based fertilizers and DAP were applied at the same P rate, 46 kg P2O5 ha-1. A control without bone and DAP was included in the experiment. Measured parameters include dry matter (DM) yield and P uptake. Results from this experiment will be covered in a poster presentation, with discussion focusing on the usefulness/effectiveness of coffee wastewater for acidifying animal bones and thus P release, as well as the impact of grinding on P availability.


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Abstract: Most previous studies focused on intercropping systems involving two-crop associations. However, there is much scope to improve existing cropping systems by devising and evaluating modifications that allow more effective use of the season. To this effect, experiments were conducted to quantify efficiency of sequential intercropping consisting of maize (Zea mays L.), common bean (Phaseolus vulgaris L.) and mung bean (Vigna radiata (L.) Wilczek) during 2007 and 2009 cropping seasons, in southern Ethiopia. Treatments included three- and two-crop associations and equivalent sole crops of components. Land equivalent ratio (LER) and area time equivalency ratio (ATER) were used to estimate intercropping advantage. Maize had the highest partial LER, 0.95, whenever mung bean comes first in the sequence. Comparable partial LERs were observed in common bean irrespective of planting times while mung bean had greater partial LERs from simultaneous rather than sequential planting. Maize had the highest competitive ratio (1.56) followed by common bean (0.67) and mung bean (0.53). The three-crop association involving simultaneous planting of maize with mung bean followed by common bean (MZ + MB − CB) gave the highest mean total LER of 1.66. This combination also had the highest combined productivity and maximum monetary gain, which is above the minimum acceptable marginal rate of return. It exceeded advantages from intercrops of maize–common bean by 41% and maize–mung bean by 23%. Thus, farmers would get greater advantage from practicing sequential intercropping in areas where the season is sufficient to grow long-duration maize.

**Abstract:** Planting density is a vital management tool that could be used to enhance productivity. A field experiment was conducted to examine the response of two pigeon pea varieties (ICPL 87091 and ICP 15027) to five planting densities (166666, 200000, 250000, 333333 and 500000 plants ha\(^{-1}\)). A split plot design with variety as main plot factor and planting density as sub plot factor was used. Samples were taken every two weeks until physiological maturity starting from 30 Days after Sowing (DAS). The upper two densities, 333333 and 500000 plants ha\(^{-1}\), had greater Leaf Area Index (LAI) and fractional interception (f) during most of the growth period and attained full interception at 105 DAS. The remaining three densities had lower LAI and f and did not attain full interception. Cumulative Intercepted Photosynthetically Active Radiation (CIPAR), extinction coefficient (k) and Radiation Use Efficiency (RUE) increased with rising planting density though moderately for the later. There was a positive linear relationship between dry matter production per area and planting density. Dry matter was significantly correlated with LAI (r = 0.90), CIPAR (r = 0.98) and RUE (r = 0.88). The two varieties had similar productivity potential with similar leaf area indices, CIPAR, k and RUE values. The RUE values obtained were 1.81 g MJ\(^{-1}\) PAR for variety ICPL 87091 and 1.86 g MJ\(^{-1}\) PAR for variety ICP 15027. Because of pigeon pea’s adaptation to drought, it will be useful to study its response to planting density under contrasting moisture levels.

**Key words:** Density, extinction coefficient, growth, light interception, radiation use efficiency


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**Abstract:** Seven released, one local and two potential, totally 10, common bean (*Phaseolus vulgaris* L.) genotypes representing three growth habit groups were tested under sole cropping and in association with hybrid maize (*Zea mays* L.). The experiments were conducted during the 2005 and 2006 cropping seasons in southern Ethiopia to compare genotypes and growth habit groups of common bean and to identify genotypes that give maximum intercropping advantage. A split-plot design with three replications was used with cropping system and genotype as main and sub plot factors, respectively. The bean genotypes varied significantly in productivity under both cropping systems. Determinate and bush types performed better than indeterminate and semi-climbing types, respectively. The mean yield from all bean genotypes was used for standardizing and specific genotype combinations showed a mean land equivalent ratio as high as 1.34. Grain yields and ranks of the bean genotypes were positively correlated between the two cropping systems. Furthermore, there was no significant genotype by cropping systems interactions indicating that genotypes selected for performance under sole cropping could perform well in association with hybrid maize. Using improved bush bean cultivars such as DOR-554 and AFR-772 in association with hybrid maize could enhance intercropping advantage.

**Key words:** Growth habit, maize, *Phaseolus vulgaris*, yield, yield components


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**Abstract:** The response of common bean (*Phaseolus vulgaris* L.) to different moisture, and light regimes was examined in a 5 x 2 factorial field experiment in Ethiopia. The soil moisture levels were: (1) well watered throughout (2) stress during the vegetative phase (3) stress during the flowering phase (4) stress during the seed filling phase and (5) stress throughout. The two light levels were: (1) full light and (2) 50% shade. The
highest seed yield loss due to water stress was observed for the seed filling phase followed by the flowering and vegetative phases. There were significant interactions between moisture availability and light intensity for seed yield. Shading reduced seed yield under full water supply or early drought while it increased it under terminal and season-long drought. Seed yield was significantly correlated to pod number per plant, under both light regimes. Plants under full light produced 34% less pods on the main stem but 158% more on the branches —impared to shaded plants. Water use efficiency was significantly decreased by water stress while shading increased it by 27%. Under full light, total intercepted PAR and RUE accounted for 90% of the variation in seed yield while it is 83% in the shade. Light interception during seed filling contributed 56% and 33% of the explained variation in seed yield under full light and shade, respectively.

Key words: Light interception, Phaseolus vulgaris, radiation use efficiency, seed yield, Shading


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Abstract: Haricot bean (Phaseolus vulgaris L.) production is subjected to intermittent drought, which is often combined with various regimes of temperature in different agroecological regions. The objective of this investigation was to study effects of moisture availability on an indeterminate cultivar during three developmental phases and two temperature regimes. Eight factorial combinations of a wet and a dry soil moisture regime during the vegetative, flowering and seed filling phenological phases, at both 18 and 24°C constant temperature were used. Water stress significantly reduced flower bud number at the end of the vegetative and flowering phases. Flower bud number was similar for the two temperature regimes at the end of the vegetative phase, but there were more buds at the end of flowering at the higher temperature. The highest seed yield loss observed was 28% due to water stress during the seed filling phase followed by water stress during flowering. Stepwise multiple regression showed that moisture level during seed filling accounted for the largest portion of seed yield variation at both temperatures. However, moisture level during the vegetative phase was more important than during the flowering phase at 18°C, whilst the reverse was true at 24°C. Pod number per plant explained 81 and 52% of the variation in yield under 18 and 24°C, respectively. Despite a similar total biomass at both temperature regimes and a larger potential reproductive capacity at the higher temperature, seed yield was 18% lower at 24°C. Water use efficiency for seed yield was significantly reduced under high temperature.

Key words: Phaseolus vulgaris, Phenological phases, Temperature, Water stress, Yield; Yield components.


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Abstract: Maize-tef (Eragrostis tef (Zuc.) Trotter) relay intercropping is practiced in parts of southern Ethiopia. However, the impacts of maize (Zea mays L.) planting pattern and leaf stripping by farmers are not yet understood. The efficiency of maize-tef relay intercropping was assessed under different combinations of maize planting pattern and leaf removal. Planting pattern included broadcasting, 60 cm x 37.5 cm, 75 cm x 30 cm, and 100 cm x 22.5 cm, while leaf removal consisted of no leaf removal, leaf removal below the ear, and leaf removal below the ear plus two leaves removal at ten days interval. Tef was sown by broadcasting under the standing maize crop about 35 days from maize silking. Broadcasting and narrow inter-row maize spacing significantly (P<0.05) reduced grain yields of both maize and tef. Maize leaf removal below the ear improved tef grain yield without reducing maize yield significantly. Additional leaf removal above the ear significantly (P<0.05) improved tef straw yield but not grain yield. Leaf removal was accompanied by shortening of days to maturity of maize and tef. Improved performance of tef due to wider
inter-row spacing and defoliation was associated with increased vigour and density. Land equivalent ratio values ranged up to 1.3, which indicated an acceptable level of efficiency for the cropping system.

**Key words**: Eragrostis tef, land equivalent ratio, Zea mays


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**Abstract**: As a dominant component crop in intercropping systems, common bean is exposed to radiation deficit during various phases. An indeterminate cultivar was examined from twenty-seven treatments consisting of all possible combinations of three levels of photosynthetic irradiance, 100, 250 and 400 µmol m⁻² s⁻¹, applied during three phenological phases. Acclimation characteristics to reduced irradiance included lower chlorophyll a/b ratio, reduced stomatal density, increased specific leaf area and leaf area ratio and increased shoot-root ratio. Susceptibility of the phases varied when comparisons were made based on entire phases and a magnitude that considered timing and light interception. Number of pods per plant, the predominant yield component, responded to irradiance level during all phases but most during flowering. For number of seeds per pod the only relevant phase was seed filling while seed weight responded during flowering and seed filling. A significant interaction between the irradiance levels of phases was observed for pod number.

**Key words**: Phaseolus vulgaris, irradiance, phenological phases, acclimation characteristics, seed yield, yield components


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**Abstract**: Leaves and branches of bermuda grass, *Cynodon dactylon* (L.) Pers., were exposed to various concentrations of NaCl and KCl salt solutions and were examined using light microscopy, electron microscopy and atomic absorption spectrophotometer. Salt secretion was observed first as droplets and later on as salt crystals. Even though salt was secreted at both sides of the leaf, most of the secretion occurred at the abaxial side of the leaf. The salt was secreted by salt glands which are distributed on the adaxial and abaxial leaf surfaces. Each gland consists of two cells: the basal cell and the cap cell. This plant bears salt glands with a mean density of 765 cm⁻². Amount of secretion was influenced by the external salt concentration. The amount of sodium secretion increased following an increase in the external NaCl concentration of up to 0.2 M. Leaves secreted more than 50 percent more under a higher relative humidity than under a lower relative humidity at higher NaCl concentrations. This suggests the influence of water stress on secretion. The secretion mechanism was found to be selective for sodium against potassium. Mixed treatment of NaCl and KCl markedly reduced secretion of sodium while the effect on potassium was less significant. Salt secretion of *C. dactylon* has an ecological significance in maintaining low salt levels in the shoot. It could play perhaps an important role in the rehabilitation of saline soils.

**Key words**: Cynodon dactylon, salinity, salt glands, salt secretion

Abstract: The use of locally available, nutrient rich organic sources is an effective means for improving soil fertility and increasing crop yield in view of the escalating cost of inorganic fertilizers and low fertilizer use efficiency of crops. *Erythrina bruci* is one of the endemic N-fixing leguminous trees that can be used to improve soil fertility in Ethiopia. Chemical analysis of leaf and twig samples revealed that *E. bruci* averagely has N (Nitrogen), P (Phosphorus) and K (Potassium) contents up to 4.83%, 0.38%, and 2.24%, respectively. Motivated by its high NPK content, studies were conducted for two years (2007–2008) on the effects of application of *E. bruci* biomass alone or in combination with inorganic fertilizers on the yield and yield components of bread wheat in the Kokate area of southern Ethiopia. *E. bruci* biomass (5–10 t ha⁻¹) incorporated into the soil one month before planting wheat have increased the grain yield of wheat by 82–127% than that of control. Biomass applied at 10 t ha⁻¹ produced grain and straw yields comparable to that produced with the recommended N and P fertilizers (N₄₆P₄₀) for wheat production in Kokate area. Combined applications of 10 t ha⁻¹ *E. bruci* biomass + half of the recommended dose of inorganic fertilizers (N₄₆P₄₀) increased grain yield by 173% over the control and gave superior yield than either input applied alone. It is concluded that resource-poor farmers can get reasonably high yields by applying biomass at 10 t ha⁻¹ through direct incorporation into the soil one month before planting wheat. The recommended dose of inorganic fertilizers can be reduced to half if supplemented by using 10 t ha⁻¹ *E. bruci* biomass. Therefore, *E. bruci* as green manure can be helpful as cost effective strategy for increased wheat yield at farm level.

Key words: Organic nutrient sources, Inorganic fertilizers, NPK, Green manure, Yield


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Abstract: The study was conducted to investigate growth and nodulation response of Clark 63-K soybean variety to *Bradyrhizobium japonicum* inoculation and phosphorus levels under lath house condition at Jima Agricultural Research Center in 2010. The crop was evaluated in terms of nodule number, nodule volume, nodule dry weight, shoot nitrogen content, plant height, number of pod bearing branches, shoot dry matter and root dry matter. The result revealed that an interaction effect of the main factors did not significantly (P < 0.05) influence number of pod bearing branches, shoot dry matter and root dry matter yield of the crop. In terms of shoot nitrogen content and plant height, Clark 63-K soybean had no response to inoculation when it was grown without phosphorus. However, inoculation significantly (p <0.05) increased these parameters over the uninoculated control when 60, 120 and 180 mg kg⁻¹ phosphorus were applied. For uninoculated and inoculated treatments, phosphorus significantly (p <0.05) influenced all nodulation and growth traits. The three phosphorus treatments (60, 120 and 180 mgkg⁻¹) significantly (p < 0.05) improved pod bearing branches, shoot and root dry matter yield over the untreated control. Inoculation coupled with 120 mg kg⁻¹ phosphorus level being considered an optimal combination for Clark 63-K soybean production in the area.

Key words: Growth, nodulation, phosphorus, soybean.

SCHOOL OF ENVIRONMENT, GENDER AND DEVELOPMENT


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Abstract: This cross-sectional study aims at identifying the demographic and socio economic barriers to family planning services utilization in Mojo town, Oromiya region of Ethiopia. The study used data collected from 551 women respondents (age 15-49) selected through systematic random sampling techniques. Data were analyzed using both univariate and multi-variate (logistic regression) statistical techniques. The findings of the study revealed that the level of knowledge and approval of family planning were high, 91.5 and 82.2% respectively. However, the actual practice of family planning methods was found to be low where only 38.3 were using a family planning method at the time of the survey. The commonest methods for both ever and current users were injectable, pills and condom, whereas the commonest source of family planning information was reported to be clinics. The logistic regression model showed that the likelihood of family planning service utilization is higher for those with higher parity, literate, approved use of family planning methods, discussed with husband/partners and those exposed to mass media. Fertility related, opposition, methods related, and access to sources/knowledge were reported reasons by non-users. Finally, based on the key findings of the study, some plausible recommendations were given which includes: educating potential users about the benefits of family planning, intensive male-targeted information, improving accessibility and availability of contraceptives and building the capacity of service providers at the institutional level.

Key words: Barriers, contraceptive, service utilization, determinants, Mojo Town.

Berhanu Desta¹ and *Nigatu Regassa², 2011. On emergency contraception among female students of Haramaya University, Ethiopia: Surveying the level of knowledge and attitude, Educational Research, 2(4): 1106-1117

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Abstract: Unwanted pregnancy (UP), which may lead to unsafe abortion, is common among young women. Unwanted pregnancy can occur due to missed pills, forced sex, method failures, and condom breakage. To prevent such problem, Emergency Contraceptives (EC) are the only method that can be used after unprotected sex. This cross-sectional study has thus aimed at investigating the level of awareness, knowledge and attitudes of young female students of Haramaya University (HU) on EC. The study generated the required data from a representative sample of 572 female students drawn from the study population through multistage sampling. Data were collected using survey questionnaire, and subsequent analysis was done using simple descriptive statistics and multivariate analysis (logistic regression model).The findings of the study revealed that 47.6% of the respondents had ever heard about EC; 25.7% had good knowledge of EC, and 76.5% had favorable attitude toward EC. In the multivariate analysis, certain variables have become significant predictors of awareness of EC including: age, previous place of residence, religion, grade level, knowing other methods preventing unwanted pregnancy, sex education, chewing ‘Khat’, and consuming alcohol. Similarly, religion, grade level, father’s educational level, knowing other methods of preventing unwanted pregnancy, and currently chewing Khat were found to significantly predict attitude toward EC. Finally, the study has forwarded some recommendations based on the key findings.

Key words: Emergency contraception, Unwanted pregnancy, Haramaya University, Awareness, Knowledge, Attitude, ‘Khat’ Chewing


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Abstract
Objectives: This study has aimed at examining the contribution of selected pregnancy and postnatal health care services to Infant Mortality (IM) in Southern Ethiopia.

Method: Data were collected from 10 rural villages of the Sidama zone, Southern Ethiopia, using structured interview schedule. The 1094 eligible women respondents were selected using a combination of simple random and multi-stage sampling techniques. The main outcome variable of the study (IM) was measured by reported death of infants during the twelve months preceding the survey, and was estimated at 9.6% or death of 96 infants per 1000 births. Pregnancy and health care variables were used as main explanatory variables along with other household and individual characteristics.

Results: The predicted probabilities, using three models of logistic regression analysis, have shown that four pregnancy and postnatal health care variables (antenatal care, immunization, exclusive breast feeding and wantness of the pregnancy) and women’s age are found to be significant predictors of IM in the study areas.

Conclusions: Finally, based on the key findings, some recommendations are given: promoting of institutional delivery seeking behaviour through behavioural change communications, training more Traditional Birth Attendants (TBAs), and maximizing the use of the Health Extension Workers (HEWs) stationed at village level to make house-to-house visit so as to encourage pregnant women to seek pregnancy and delivery care services.

Key words: Delivery care, infant mortality, immunization, maternal health care, Southern Ethiopia


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Summary: This study examined the nutritional status of mothers in one of the most populous food insecure zones in Southern Ethiopia, the Sidama zone. The study used primary data collected from 1094 households with a child under 24 months located in ten kebeles (the smallest administrative district). Households were selected using multi stage probability sampling techniques. The mothers’ nutritional status was estimated using both body mass index (BMI) and mid-upper arm circumference (MUAC). The results from the BMI revealed that 28.1% of the women were malnourished (BMI < 18.5) and 67.5% were normal (BMI 18.5 to <25.0), while the remaining small proportion (4.5%) fell in the overweight or obese categories. Similarly, the computation of the maternal nutritional status by MUAC showed that 31.4% of the women were malnourished (MUAC< 22). Further analysis of the main predictors of maternal malnutrition using logistic regression showed that three individual level variables and three household level variables predicted maternal malnutrition: woman’s age, duration of breast feeding, literacy status, marital form, land size and intrahousehold food distribution. The study concluded that maternal malnutrition is a serious problem in the study area and that there are contextual risk factors that could be addressed to partially understand the problem.


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Abstract: The main objective of this study is to examine the prevalence and risk factors for unintended pregnancies among selected married women in Damot Gale Woreda (a district in Southern Ethiopia). A multistage sampling technique was used to select women respondents in the reproductive age group of 15-49 years. Quantitative and qualitative data were obtained using structured questionnaires, focus group discussion and key informants interview. The dependent variable is unintended pregnancy. Demographic, socio-cultural and service related characteristics were used as explanatory variables. Of 713 women surveyed, 302(42.4%) reported that their most recent pregnancies were unintended. Most of the women (89%) knew at least one modern Family Planning (FP) methods. Further, we found that 84% of the women
have never discussed with husbands about issues concerning FP, and 80% of women have never been visited by health workers. Major reasons mentioned for failure to avoid unintended pregnancy were lack of knowledge, disapproval by husband, difficulty to get method and method failure. The predicted probability, using logistic regression, has shown that women with delayed age at marriage, with lower parity, women exposed to radio, women who discuss about FP issues with husband; those who have autonomy on their health care and those visited by FP workers are less exposed to unintended pregnancy. Finally, based on the key findings, some workable recommendations are given which includes: sustainable behavioral changes among community members, reforms in disseminating family planning and related information, enhancing women’s status at all levels through formal and non-formal education, strengthening the follow up system on FP workers and beneficiaries, improving inter-spousal communication through peer or informal education and community level orientation.

Key words: Unwanted Pregnancy, Contraception, Determinants, Southern Ethiopia, Damot Gale


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Abstract: The high level of Intimate Partners’ Violence (IPV) against women in many population groups in Ethiopia and the risk factors associated with the practice is not well understood among scholars and decision makers. This study examined the prevalence and risk factors associated with intimate partner violence in Sidama, a populous zone in Southern Ethiopia. A combination of simple random and multistage sampling techniques were used to select 1094 households, comprising women and men participants, for the field study. Quantitative and qualitative data were obtained using structured questionnaire and focus group discussions. Household, women and husband characteristics were used as explanatory variables while intimate partner violence served as the dependent variable. The study revealed that the prevalence of intimate partners’ violence is high in the study population (ranging from 14.7 to 61.2%) with physical violence (beating, causing physical damage and slapping) accounting for the largest share of the overall abusive acts. The predicted probability, using logistic regression shows that literate women living with alcoholic husbands, women engaged in gainful income generating activities and women living in food insecure households were more susceptible to intimate partner violence. The study concluded that while the main determinants are generally embedded in the socio-cultural practices and attitudes of the community, there are certain individual and household level variables which significantly affect its likely occurrence.

Key words: Intimate Partner, Violence, Sidama Zone, Southern Ethiopia


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Abstract
Background: Access to antenatal care (ANC) and postnatal care (PNC) services has great deal of impacts on major causes of infant death and significantly affects trends of mortality in a population. Antenatal care may play an indirect role in reducing maternal mortality by encouraging women to deliver with assistance of skilled birth attendant or in a health facility. In most rural settings of Ethiopia, there are challenges in increasing such health care service utilization mainly due to the fact that the decision that lead women to use the services seem to occur within the context of their marriage, household and family setting.

Objective: The study has primarily aimed at examining the prevalence and factors associated with antenatal Care (ANC) and Postnatal Care (PNC) service utilizations.

Methods: This is a cross sectional population based study undertaken in 10 rural villages of the Sidama zone, Southern Ethiopia. The data were collected from a representative sample of 1094 households drawn from the study population using a combination of simple random and multistage sampling techniques. Two dependent variables were used in the analysis: The ANC, measured by whether a woman got the service (at
least once) from health professional or not during her last pregnancy, and PNC which was approximated by whether the last born child completed the required immunization or not. Household and women’s characteristics were used as explanatory variables for both dependent variables.

**Results:** The study has revealed that the level of ANC and PNC service utilizations are 77.4% and 37.2% respectively. The predicted probabilities, using logistic regression, has shown that women who are literate, having exposure to media, and women with low parity are more likely to use both ANC and PNC services.

**Conclusion:** The study has concluded that antenatal care service utilization was generally good while the postnatal care given to new born children was very low compared to other population groups in the region. Promoting women’s education and behavioral change communication at grass root level, provision of the services at both home and health facilities, and improving the quality and capacity of the health providers are some of the recommendations forwarded.

**Key words:** Antenatal Care, Postnatal Care, Service Utilization, Complete Immunization, Sidama Zone, Southern Ethiopia.


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**Abstract:** This study has aimed at examining the small holder farmers’ coping strategies to sustained household food insecurity and hunger in Southern Ethiopia (Sidama Zone). In order to collect the required input data, a comprehensive interview schedule was developed. The data were collected from 614 households who were selected through two-stage probability sampling technique. The association of each predicting variable and the dependent variable (coping strategies), controlling for all confounding factors, was examined using the multivariate analysis. The result revealed that about 54% of the households were facing mild to severe food insecurity, and of which, about 28% fall in household hunger category (as measured by Household Hunger Scale) for more than six months of the year. The study further showed that households in the study area employ a range of coping strategies to respond to the high and sustained food insecurity and hunger, ranging from minimizing the number of meals and amount of food consumption to out-migration of household members during chronic food shortage. The findings of the multivariate analysis using multiple regression technique documented that some demographic and socio-economic variable (such as age of the household head, educational status, access to main social service and others) have associations with the number of coping strategies practiced by the households. Finally, few recommendations were given based on the key findings of the study, which includes promoting income-generating activities, enhancing the micro-financing efficiency, creating employment opportunities at local areas to deter unskilled labor migration, on farm diversification and the like.

**Key words:** Food insecurity, hunger, copying strategies, Southern Ethiopia, Sidama Zone


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**Abstract**

**Objective:** To examine household food insecurity and hunger in one of the most populous zones in Southern Ethiopia, the Sidama Zone.

**Design:** Cross-sectional survey administered individually by trained interviewers. Food insecurity was calculated with both the Household Food Insecurity Access Scale (HFIAS) and Household Hunger Scale (HHS), developed by the Food and Nutrition Technical Assistance (FANTA) project.

**Setting:** Rural households from ten kebeles (the smallest administrative district) selected from two agro-climatic zones in Sidama, Southern Ethiopia from December, 2010 to January, 2011.
Subjects: Men and women respondents from 1094 rural households were selected using multistage sampling techniques.

Results: Using HFIAS, 17.7% of the households were food secure. The percentage of households who were mild, moderately and severely food insecure was 6.8, 27.7 and 47.8% respectively. Using the HHS, 29.0 and 5.6% of households fell into the moderate and severe household hunger categories. Using multivariate statistical techniques, six variables explained more than 25% of the variation in both food insecurity and hunger. These variables were migration of a household member, households’ access to credit services, needing food aid, alcohol intake by the household head, agro-climatic zone and wealth index.

Conclusions: This study documented that food insecurity is a major concern of smallholder farming households in the study area. A substantial majority of the households were facing mild to severe food insecurity and hunger for an extended period of time.

Key words: Food security, Hunger, Household food insecurity, Access scale, Ethiopia


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Abstract: The main objective of this study is to assess higher education students’ attitudes and practice on preventive measures against HIV/AIDS. The 606 study participants were drawn from Addis Ababa University, which is the oldest and biggest public university in Ethiopia, through multistage sampling. Data were collected using survey quantitative (questionnaire) and qualitative (FGDs), and subsequent analysis was made through the use of descriptive statistics (frequency and logistic regression model). The results of the study revealed that 207(34.2%) of respondents were sexually active during the survey. Of these, 144(23.8%) had sexual intercourse with their partner or someone in the last 6 months. The mean and median age at first sex debut was computed as 17.8 and 18.0 years respectively. About 65.5% of the respondents had favorable attitude to HIV prevention. Three hundred and fifty nine (59.2%) of the respondents had experienced at least one of the three HIV prevention practices. Of which, more than half (52.4%) adopted abstinence as top preventive measure. The result also showed that out of the total respondents, 47.2% had been tested for HIV/AIDS and more than 80% had willingness to take VCT service for HIV/AIDS. Sex, previous residence, religious participation, pornographic viewing, alcohol intake, chewing ‘khat’ and cigarette smoking were found to have association with students’ attitude on HIV prevention. Similarly, age, having pocket money, pornographic film show and currently “khat” chewing are found to have some association with practices of HIV prevention. Finally, based on the findings, the study has forwarded some workable recommendations: Focus on more practical and workable preventive measures, strengthening HIV testing and anti-retroviral treatment services, and effective implementation of in-campus HIV policy are the major ones.

Key words: Attitude, Practice, HIV, Prevention, Addis Ababa University, chewing khat


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Abstract: Solid waste, which is a consequence of day-to-day activity of human kind, needs to be managed properly. Addis Ababa, like other cities in developing countries, faces problems associated with poorly managed solid waste operation. This study deals with analysis of the city’s current municipal solid waste management problems, opportunities and existing solid waste management practices. The survey was conducted in Bole and Akaki Kality sub-city. Different sampling methods were employed to select the study units including: stratified sampling, systematic random sampling, and purposive sampling. Though the bulk
of the data collected were qualitative in nature, it was also supported by quantitative information collected through survey and secondary sources. The study revealed that the reasons for low performance of SWM in the city includes: inaccessibility of the city due to the geographical and urban structure, lack of properly designed collection route system and time schedule, inadequate and malfunctioning operation equipment, open burning of garbage, poor condition of the final dump site, littering of the corner around the skips which encouraged illegal dumping, inadequate and malfunctioning equipment, and unreliable service are among the institutional challenge that the city encountered in the sector. Finally, the study forwarded some important recommendations towards improving the statuesque.

**Key words:** Waste, Management, Disposal, Re-use, Addis Ababa

*Nigatu Regassa¹ and Ansha Yusufe¹, 2009. Gender differentials in migration impacts in Southern Ethiopia, Anthropologist, 11(2): 129-137

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**Abstract**

**Context:** The Southern Nations, nationalities Peoples Region (SNNPR) of Ethiopia is experiencing one of the highest population growth rate (about 2.8 percent per annum) mainly as a result of very high fertility rate (Total Fertility Rate, TFR, of 5.9). Like in other parts of the country, rural-urban migration is an increasingly becoming common phenomenon mainly as direct response to environmental degradation and rural poverty. While there are interwoven socio-economic and ecological factors contribute to the migration of influx of people into the increasingly important medium sized urban areas of the region, the migration impacts on the migrants at destination (urban centers) is less researched, and hence, worth investigating. This article thus tries to examine the gender differentials of migration impacts at the place of destination by taking the experiences of four major urban areas of the Southern Region (Awassa town, Wolkite town, Durame, and Soddo).

**Method:** The study is based on primary data collected from 821 urban migrants selected from four of the most populous district (zone) of southern Ethiopia namely Sidama, Wolayita, Kembata Tembaro and Guraghe zones. The study has employed Chi-square analysis to examine the possible gender differentials of migration impacts at the place of destination. The study employed both the quantitative and qualitative approaches in the course of collecting and analyzing the data.

**Results:** The study has documented that there are certain gender differentials in the impacts of migration at the place of destination: Male migrants are more prone to some of the socio-economic problems (such as unemployment) than their counterpart female migrants. Similarly, female migrants are found to be more prone to some of urban problems (such as, lack of food, lack of adequate health service, homesickness, labor and sexual abuses and the like) than their counterpart migrants.

**Key words:** Gender, Differentials, Southern Ethiopia, Zones, Woredas and kebeles,

*Nigatu Regassa, 2006. Levels and Patterns of Natural Marital Fertility among low contraceptive Communities of Southern Ethiopia, Journal of Demography, 35: 2

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**Abstract:** This article is an empirical study aimed at estimating the level and patterns of natural marital fertility among some selected low contraceptive communities in Southern Ethiopia. The data were collected from 1467 ever-married women who were selected through the multistage stratified sampling technique. The estimation of the levels and age patterns of natural marital fertility was done by the application of a model originally developed by Coale and Trussell, and later modified by Xie. The estimation of the level of fertility revealed that the adjusted Total Marital Fertility Rate(TMFR) is 7.01 The analysis on the age patterns of
natural fertility of the study population revealed that the population is experiencing very little voluntary control of birth (m = 0.15), and follows the typical age patterns of natural fertility. Finally, the study has given some policy implications of the findings and recommendations.

SCHOOL OF NUTRITION, FOOD SCIENCE AND TECHNOLOGY


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Abstract: Background: More than two billion individuals worldwide have inadequate iodine intake and the adverse consequences of iodine deficiency are widely observed. Objective: To assess the iodine status of primary school children and the knowledge of iodine deficiency disorders among their caretakers. Methods: A cross-sectional study was conducted in Hawassa Town, Southern Ethiopia. The study participants were school children (n=116) aged 7-9 years. A two-stage sampling method was used to select participants. Goiter and urinary iodine concentration were measured in the children to evaluate their iodine status. Socioeconomic characteristics, dietary patterns and caretaker knowledge of iodine deficiency were assessed by using questionnaires. Household salt iodine concentration was also measured. Results: Total goiter rate was 13.6% and was significantly associated with age [AOR=13.4 (3.2-55.7)]. Eighty two percent of the children had urinary iodine concentration below 50 µg/L, indicating the presence of moderate iodine deficiency. None of the households were using adequately iodized salt. More than half of the respondents did not know about the importance of iodized salt. Conclusion: The observed degree of iodine deficiency in children and the limited knowledge about iodine in an urban area such as Hawassa stress the urgent need for implementing interventions to combat iodine deficiency.


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Abstract: Ethiopia is one of the countries in Africa with a high prevalence of HIV/AIDS. Though the introduction of highly active antiretroviral therapy (HAART) improved survival and quality of life, early data from those treated, raised concerns about a possible increase in both peripheral and coronary arterial disease through lipodystrophy, diabetes mellitus and dyslipidemia. Hence an attempt was made in this study to assess the prevalence of lipodystrophy and to understand risk factors in HIV positive subjects receiving HAART. Study participants were men and women who were HIV/AIDS patients receiving HAART from Sodo government hospital, Southern Ethiopia. Data was collected on sociodemographic characteristics, HAART use, CD4 count, and subjects’ status at the start of treatment, measure of body fat distribution and physical activity. In the present study the prevalence of moderate to severe clinical lipodystrophy in HIV-infected subjects receiving HAART for at least 6 months was 15.9%, lipoatrophy was 9.1% and lipohypertrophy was 6.8%. Subjects who had been on HAART for 4 yrs or more, engaged in much lighter work intensity and who were underweight and overweight or obese had higher prevalence of lipodystrophy. In multivariate analysis, gender, duration of HAART, work intensity and recent BMI remained significantly associated with overall lipodystrophy. In multivariate analysis, for phenotypes of lipodystrophy, only work intensity remained significantly associated with lipoatrophy whereas work intensity and duration of HAART remained significantly associated with lipohypertrophy. Lipohypertrophy and lipoatrophy were positively associated with diabetes mellitus, while only lipohypertrophy was associated with hypertension. None of the
HAART drugs or regimens were significantly associated with lipodystrophy and diabetes mellitus. Lipodystrophy syndrome has severe health consequences, as it may be responsible for stigma, reduced adherence to antiretroviral treatment, and increased risk of cardiovascular diseases.

Key words: Lipodystrophy, associated factors, HIV, highly active antiretroviral therapy (HAART)


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Abstract
Aims: In Ethiopia, AIDS has become the leading cause of mortality in the 15-49 years age group, accounting for an estimated 43% of all young adult deaths. Though the introduction of highly active antiretroviral therapy (HAART), improved survival and quality of life, early data from those treated, raised concerns about a possible increase in both peripheral and coronary arterial disease through lipodystrophy, diabetes mellitus and dyslipidemia. Hence an attempt was made in this study to understand risk factors of HIV positive subjects and prevalence of lipodystrophy, type II diabetes mellitus and hypertension in subjects receiving HAART.

Study Design: Institution based cross sectional and retrospective study was conducted. Place and Duration of Study and Sample: Study participants were men and women who were HIV/AIDS patients receiving HAART from Sodo government hospital, Southern Ethiopia from December 1st, 2009 - January 30th, 2010.

Methodology: By using the subjects’ electronic database as sampling frame, a total of 176 subjects were recruited for the study using simple random sampling method. Data was collected on socio demographic characteristics, HAART use, CD4 count, subjects’ status at the start of treatment, measure of body fat distribution, physical activity, blood pressure and blood glucose.

Results: Prevalence of Diabetes mellitus was seen in 8% of the subjects. Hypertension was seen in 15.9% of the subjects. In multivariate analysis adjusted for age and duration of HAART both lipoatrophy and lipohypertrophy were significantly associated with diabetes mellitus while only lipohypertrophy (adjusted for age) remained to be significantly associated with hypertension.

Conclusion: Since lipodystrophy (adjusted for age and duration of HAART) was significantly associated with diabetes mellitus and lipohypertrophy (adjusted for age and duration of HAART) was associated with diabetes mellitus and (adjusted for age) was associated with hypertension, there is a need to investigate types of HAART regimens which do not lead to lipodystrophy and associated diabetes mellitus or hypertension in AIDS/HIV subjects.

Key words: AIDS/HIV, HAART, risk factors, lipodystrophy, Diabetes mellitus, hypertension


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Abstract
Background: Literature has shown that there is vicious cycle between malnutrition and HIV infection. In Ethiopia, antiretroviral therapy (ART) was started about eight years back but, to the best of authors' knowledge, there was no published study that assessed treatment outcome indicators.

Objective: To assess the outcomes of ART from the perspective of nutritional, clinical, functional and immunological status.

Methods: A retrospective recorded review was used to assess the nutritional status of adults before and after ART in Hawassa University referral hospital. This analysis included 358 living HIV positive adults who were on ART for 3 – 96 months.

Results: The mean age of the study participants was 33.75 ± 9.12 years and the median duration of ART was

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24 months (Inter-quartile range: 12, 36). After ART, cases with body mass index (BMI) <18.5 kg/m² dropped from 38% to about 20% and cases with CD4 count < 200/mm³ dropped from about 73% to about 9% (P < 0.0001 for each). However, there were 58 and 14 cases whose BMI and CD4 count were even below the Pre-ART levels, respectively. The regression line demonstrating an overall change in CD4 count showed a positive linear trend as the duration of ART increases but the change in BMI was a downward linear trend. In multiple linear regression, current nutritional status was found to have significant association with baseline low CD4 count, clinical stage III/IV, low BMI and low meal frequency. Multiple logistic regression also demonstrated a significant association of low BMI after ART with low CD4 count before ART. With ART, decreased frequency of illness, baseline WHO clinical stage I/II and high BMI were independent predictors of improvement in functional status.

**Conclusion:** Patients started on ART with low BMI, severely immunosuppressed and clinical stage III/IV illnesses were found to have poorer nutritional, functional and immunological response. This study provided another evidence to support the WHO recommendation on initiating ART before patients’ nutritional, clinical and immunological statuses deteriorate. The nutritional care needs to be given more emphasis since the ART response was found to be unsatisfactory.

**Key words:** ART, BMI, CD4 count, functional status, nutritional status, WHO clinical stage.


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**Abstract:** Background: Improving nutritional care and support for people living with HIV (PLHIV) is an integral part of comprehensive HIV treatment according to the National Nutritional Strategy of Ethiopia. However, there is no adequate published study that assesses the nutritional care and support services for adult people living with HIV/AIDS (PLHIV) in this setting.

**Objective:** The objective of the study was to identify the existing nutritional care and support services and determine the challenges facing adults living with HIV at Hawassa Referral Hospital in southern Ethiopia.

**Methods:** A qualitative study was carried out using focus group discussions (FGDs), in-depth interviews and participant observation. Four FGDs were held and five in-depth interviews were conducted. A two-week participant observation was also conducted by trained nurses. All interviews and FGDs were tape-recorded and transcribed; those conducted in Amharic were translated back to English. Finally thematic analysis of the transcripts was performed.

**Results:** Most of the FGD participants were unsatisfied with their nutritional care and support services and expressed difficulty with disclosing their HIV status for fear of stigma and discrimination. The in-depth interviews and participant observation showed results similar to those of the FGD. Some key informants expressed a fear that such poor nutritional care and support may threaten the quality of life of people living with HIV and suggested that all stakeholders work on improving the services.

**Conclusion:** Current nutritional care and support services for people living with HIV are not well coordinated. They focus mainly on monthly supplementation of antiretroviral drugs and occasional handouts of food. The need to provide health education on antiretroviral drugs and nutrition, and to emphasise strategies aimed at improving the nutritional status of peoples living with HIV is critical. Furthermore, the study recommended strengthening the initiatives of some organisations regarding sustainable income-generating activities.

**Keywords:** Africa, HIV/AIDS, qualitative research, stigma and discrimination
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SCHOOL OF VETERINARY MEDICINE

Ababayehu Tadesse¹, Abdurahmn Omar², Kassaye Aragaw¹, Berhanu Mekbib¹ and *Desie Sheferaw¹, 2012. A Study on Camel Trypanosomosis in Jijiga Zone, Eastern Ethiopia. Journal of Veterinary Advances, 2(5): 216-219

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Abstract: A cross-sectional study was conducted from October 2008 to June 2009 with the objective of estimating the prevalence of camel trypanosomosis (surra) and identifying the species of trypanosome involved in Jijiga Zone. The method employed was the Buffy coat examination under microscope. The overall prevalence of camel trypanosomosis was found to be 3.9% (14/362), and the only species identified was Trypanosoma evansi. The prevalence of Trypanosoma evansi was not significantly (P <0.05) varied between males (3.6%) and females (3.9%) camels. Higher prevalence of trypanosomosis observed in adult camels (4.5%), and no young camel (0 to 4 years) was found positive. The mean PCV was significantly (P <0.05) lower in parasitaemic camels (24.7%) than in aparasitaemic camels (28.9%). The result of his study showed that camel trypanosomosis is prevalent in Jijiga zone and it is a disease of major economic importance in the area.

Key words: Trypanosomosis, buffy coat, prevalence, T. evansi, Ethiopia

*Abebayehu Tadesse¹, Endris Fentaw², Berhanu Mekbib¹, Rahmeto Abebe¹, Solomon Mekuria¹ and Endrias Zewdu², 2011. Study on the prevalence of ectoparasite infestation of ruminants in and around Kombolcha and damage to fresh goat pelts and wet blue (pickled) skin at Kombolch Tannary, Northwestern Ethiopia, Ethiopian Veterinary Journal, 15(2): 87-101

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Abstract: An attempt was made to study the prevalence of ectoparasites on live animals as well as fresh goat pelts and pickled (wet-blue) skins at Kombolcha tannery, south wollo zone, North-Eastern Ethiopia. A total of 240 cattle, 175 sheep, 66 goats, were used to study the prevalence of ectoparasites on live animals as well as 344 fresh goat pelts and pickled (wet-blue) goat skins were used to assess skin defects. The result obtained from live cattle demonstrated a high prevalence of Amblyomma (28.33%) followed by Sarcoptes scabiei (23.75%), Boophilus (11.25%) Demodex (9.58%), Psoroptes (0.4 %), respectively. The prevalence of ectoparasite infestation of live sheep revealed Mellophagus ovis (sheep ked) (32.57%), Bovicola ovis (22.28%), Amblyomma spp (12.57%), Sarcoptes scabiei (14.28 %), Ctenocephalides spp (8.57%), Demodex (6.85%), Linognathus africanus (6.28%) and Boophilus spp (4%). The result from goats demonstrates a high prevalence of Sarcoptes scabiei (30.3%) followed by Linognathus stenopsis (9.09%), Amblyomma (4.5%), Ctenocephalides spp (3.03%), Bovicola caprea (1.51%) and Demodex (1.51%) in that order. Result obtained from fresh goats pelts revealed an overall high prevalence of Sacoptes scabie (53.29%) followed by Linognathus stenopsis (9.88%), Bovicola caprae (2.08%) and Demodex (2.08%). Examination of pickled (wet-blue) skins from follow-up skins show a high prevalence of scratch (74.25%) followed by “Ekek” (68.56%), scar (67.06%), processing defect (28.44%). “Ekek” (Typical scatter type cockle) was found to show a significant (P<0.5) association with Sarcoptes scabiei, Linoganthus stenopsis, scratch and diseases scars, indicating the likely multifactor causes and one major skin problems in the study area.

Key words: Prevalence, Ectoparasite, Cattle, Sheep, Goat, Goat pelts, Kombolcha

*Abebayehu Tadesse¹, Eset Hadgu¹, Berhanu Mekbib¹, Rahmeto Abebe¹ and Solomon Mekuria¹, 2011. Mechanically Transmitted Bovine Trypanosomosis in Tselemtty Woreda, Western Tigray, Northern Ethiopia, Agricultural Journal, 6(1): 10-13

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The study was conducted in five villages of Tselemtay woreda, Western Tigray. The data was gathered to observe the prevalence of mechanically transmitted trypanosomosis in cattle. Blood samples were collected from 300 heads of randomly selected cattle of both sexes and different age groups. The body condition of the study animals was also recorded. Samples collected for PCV evaluation were used to prepare blood films for the morphological identification of the parasite. An overall prevalence of trypanosome infection in the study area was 2.66% and all of these infections were due to *Trypanosoma vivax*. This study revealed that there was no statistically significant difference (p>0.05) in the prevalence between male (1.02%) and female (3.46%) and between adult (3.18%) and young (1.25%) animals. The prevalence of trypanosome infection in medium body condition was 1.88% and that of poor conditioned animals was 4.54%. The difference was not statistically significant (p> 0.05). Mean PCV value of parastemic animals was 21.8% and this value was significantly lower than (p< 0.05) that of aparasitemic animals with mean PCV of 29.4%. The study area is known as free of tsetse fly infection. Although, the present study indicated low prevalence of bovine trypanosomosis (2.66%) in the study area, the potential impact of *Trypanosoma vivax* infection on production and productivity of cattle shall not be undermined. Studies should also be conducted on the biting flies that are responsible to transmit the infection among the cattle population. Therefore, attention should be given to control the disease.

**Key words:** Bovine trypanosomosis, Tselemtay woreda, Tigray, prevalence, *T. vivax*


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**Abstract:** A cross-sectional study was conducted from November 2011 up to March 2012 in North Eastern Ethiopia to estimate the prevalence of equine gastrointestinal (GIT) parasites and their mean egg count and to assess the associated risk factors. Fecal samples were collected from 385 randomly selected equine (154 donkeys, 130 horses, 101 mules) and examined with direct smear, flotation, sedimentation and McMaster techniques. The overall prevalence of GIT parasites was 70.4% (271/385) with the occurrence rate of 77.3%, 72.3% and 60.8% in donkey, mule and horse, respectively. The occurrence of parasitic infection between horse and mule (x = 11.5, p = 0.045) and horse and donkey (x = 16.5, p = 0.001) significantly varied. The prevalence in donkeys, horses and mules were 70.9%, 58.5% and 67.3% for strongyles, 10.4%, 5.4% and 3.0% for *Parascaris quorum*, 4.5%, 3.8% and 4.0% for *Oxyuris equi* and 5.2%, 9.2% and 5.9% for Fasciola, respectively. The important risk factors for the occurrence of fasciolosis were sex (x²=6; p=0.014), origin of the animals (x²=21.6; p=0.000), body condition score (x²=6.7; p=0.035); for *Oxyuris equi*: age (x²=24.8; p=0.000) and body condition score (x²=10.4; p=0.006); for parascaris: age (x²=67.5; p=0.000); and for strongyles: body condition score (x²=51.7; p=0.000) and purpose of keeping the animals (x²=8.4; p=0.014). The likelihood of occurrence GIT parasites infection in male (OR = 2.4, 95%CI = 1.3, 4.6), age <3 years (OR = 3.8, 95%CI = 1.2, 12), animals used for packing (OR = 4.1, 95%CI = 1.1, 14.9) and for pack and transportation (OR = 3.1, 95%CI = 1.1, 9.2) and animals with poor (OR= 18.6, 95%CI =7.6, 45) and moderate (OR=3, 95%CI =1.3, 6.7) body condition score were found to be higher than the respective categories. Significant difference was observed in the mean egg count among the age categories (F = 11.44, p = 0.000), purpose of for which the animals were kept (F = 4.78, p = 0.009) and the body condition score of the animals (F = 7, p = 0.000). In conclusion, this work avail important information about the status of equine GIT parasites and associated risk factors.

**Key words:** Equine, GIT parasites, Mean Egg Count, Prevalence, Risk Factors, Ethiopia

*Alemayehu Regassa*¹, Gelma Golicha¹, Dawit Tesfaye¹, Fufa Abunna¹ and Bekele Megersa¹, 2013. Prevalence, risk factors and major bacterial causes of camel mastitis in Borana Zone, Oromia Regional State, Ethiopia, *Trop Anim Health Prod.*, 45(4): 1589-1595

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**Abstract:** A cross-sectional study was carried out from November 2010 up to April 2011 to estimate mastitis prevalence and associated risk factors and to assess its bacterial causes in traditionally managed camels in Borana Zone, Southern Ethiopia. Thus, 348 lactating camels were examined clinically, and subclinical cases
were checked with California mastitis test (CMT). The overall prevalence of mastitis was 44.8 % (156/348), comprising clinical (19, 5.4 %) and subclinical (137, 39.4 %) cases. The quarter level prevalence of mastitis was 24.0 % (334/1,392). Of the total 1,392 examined teats, 30 were blind, and hence, from the 1,362 non-blind CMT-examined teats, 22.3 % (304/1,362) were CMT positive. Of the 304 CMT-positive samples, 264 were culture positive (197 Gram-positive, 41 Gram-negative, and 26 mixed isolates), and 40 were culture negative. The prevalence of Staphylococcus aureus was found to be the highest at both the animal (12.8 %, 39/304) and quarter level (2.9 %, 39/1,362). Regression analysis revealed higher likelihood of mastitis occurrence among camels from Dharito (OR= 3.4, 95% CI =1.8, 6.4), Gagna (OR=3.4, 95% CI =1.8, 6.5), and Haro Bake (OR=2.6, 95 % CI=1.3, 5.1) than camels from Surupha. Likewise, there was higher chance of mastitis occurrence among camels at the early lactation stage (OR=2.3, 95 % CI=1.1, 4.6) and camels with udder/teat lesions (OR=13.7, 95 % CI=1.7, 109.4) than among camels at late lactation stage and camels with healthy udder/teats, respectively. In conclusion, this study reveals the current status of camel mastitis in Southern Ethiopia.

**Keywords**: Mastitis, Camel, Prevalence, Risk factors, Bacterial isolation, Ethiopia

*Alemayehu Regassa¹, Nebyou Moje¹, Bekele Megersa¹, Desta Beyene², Desie Sheferaw¹, Etana Debe³, Fufa Abunna and Eystein Sckervie³, 2013. Major causes of organs and carcass condemnation in small ruminants slaughtered at Luna Export Abattoir, Oromia Regional State, Ethiopia, Preventive Veterinary Medicine, 110: 139-148

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**Abstract**: A retrospective study and active abattoir survey were conducted from December 2009 to April 2010 to determine the major causes of organs and carcasses condemnation and to estimate the associated direct financial loss at Luna Export Abattoir, Central Ethiopia. The active abattoir survey was conducted on 674 goats and 451 sheep (n = 1125) and three years (2007, 2008 and 2009), retrospective data of 718,395 sheep and goats were also collected. From the retrospective data it was observed that liver was the most frequently condemned organ with condemnation rate of 32.4%, 46.7% and 70.5%, respectively. The major causes of condemnation for liver, lung, heart, kidneys and brain were cirrhosis (12.3%, 17.0% and 12.8%), pneumonia (6.6%, 11.6% and 12.5%), pericarditis (0.6%, 0.8% and 0.4%), nephritis (0.6%, 0.8% and 1.2%) and abscess (0.005%, 0.007% and 0.012%), respectively. Consequently, the overall direct financial loss from organs and carcass condemnation during the three years was estimated to be 22,993,591 Ethiopian birr (ETB) or 1,323,257 United State Dollar (USD). On the other hand, detailed post mortem inspection of liver, heart, kidneys, tongue, brain and carcass during the active abattoir survey revealed that higher losses were caused mainly due to cirrhosis (89.3 kg, 2998 ETB), pericarditis (5.4 kg, 308 ETB), faulty evisceration (8.4 kg, 472 ETB), calcification (8.4 kg, 469 ETB) and Coenurus cerebralis (4.3 kg, 243 ETB) and poor carcass condition (bonny carcass) (1390 kg, 78,500 ETB), respectively. Other causes of condemnation were also recorded and totally, about 110,361 ETB (6351 USD) was lost only from organs and carcasses condemnation during the active abattoir survey. In conclusion, this study identified the major causes of organs and carcass condemnation in Luna Export Abattoir and estimated the associated direct financial losses.

**Keywords**: Organ condemnation, Financial loss, Sheep, Goats, Abattoir, Meat inspection, Ethiopia

*Alemayehu Regassa¹, Oda Gizaw¹, Rahmeto Abebe¹, Desta Beyene², Bekele Megersa¹, Etana Debe³, Kasahun Asmare³, Fufa Abunna² and Eystein Skierve³, 2013. Cryptosporidium in Calves, Lambs and Kids at Haramaya, Eastern Ethiopia, Ethiopia Veterinary Journal, 17(1): 81-94

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**Abstract**: A retrospective study and active abattoir survey were conducted from December 2009 to April 2010 to determine the major causes of organs and carcasses condemnation and to estimate the associated direct financial loss at Luna Export Abattoir, Central Ethiopia. The active abattoir survey was conducted on 674 goats and 451 sheep (n = 1125) and three years (2007, 2008 and 2009), retrospective data of 718,395 sheep and goats were also collected. From the retrospective data it was observed that liver was the most frequently condemned organ with condemnation rate of 32.4%, 46.7% and 70.5%, respectively. The major causes of condemnation for liver, lung, heart, kidneys and brain were cirrhosis (12.3%, 17.0% and 12.8%), pneumonia (6.6%, 11.6% and 12.5%), pericarditis (0.6%, 0.8% and 0.4%), nephritis (0.6%, 0.8% and 1.2%) and abscess (0.005%, 0.007% and 0.012%), respectively. Consequently, the overall direct financial loss from organs and carcass condemnation during the three years was estimated to be 22,993,591 Ethiopian birr (ETB) or 1,323,257 United State Dollar (USD). On the other hand, detailed post mortem inspection of liver, heart, kidneys, tongue, brain and carcass during the active abattoir survey revealed that higher losses were caused mainly due to cirrhosis (89.3 kg, 2998 ETB), pericarditis (5.4 kg, 308 ETB), faulty evisceration (8.4 kg, 472 ETB), calcification (8.4 kg, 469 ETB) and Coenurus cerebralis (4.3 kg, 243 ETB) and poor carcass condition (bonny carcass) (1390 kg, 78,500 ETB), respectively. Other causes of condemnation were also recorded and totally, about 110,361 ETB (6351 USD) was lost only from organs and carcasses condemnation during the active abattoir survey. In conclusion, this study identified the major causes of organs and carcass condemnation in Luna Export Abattoir and estimated the associated direct financial losses.

**Keywords**: Organ condemnation, Financial loss, Sheep, Goats, Abattoir, Meat inspection, Ethiopia
Abstract: A cross sectional study was carried out from November 2010 to April 2011 to determine the prevalence of Cryptosporidium in calves, lambs and kids and to assess potential risk factors in Haramaya, eastern Ethiopia. Hence, fecal samples from a total of 237 study animals (133 calves, 63 lambs and 41 kids) were tested with Sheather’s flotation technique and Modified Ziehl-Neelsen Staining. Accordingly, the overall prevalence was found to be 23.6% (56/237) with the prevalence of 27.8% (37/133) in calves, 22.2% (14/63) in lambs and 12.2% (5/41) in kids. The prevalence of Cryptosporidium significantly (p = 0.047) varied with species of study animals being three times higher likelihood of occurrence in calves compared to its chance of occurrence in kids (OR = 2.8, 95%CI = 1.0, 7.6). No significant difference in prevalence was observed between kids and lambs. The occurrence of the disease was also assessed among the species of animals by taking into consideration different demographic characteristic of the animals including breed, age and sex. For caprine, the prevalence was higher in the cross breed animals (28.6%) followed by the breed of Hararge highland (25%) with no report of the disease in Boer and Ogaden breeds. In ovine, no association was observed between the infection occurrence and the potential risk factors. Analysis of the risk factors in bovine revealed a significant (p = 0.044) difference in disease occurrence among age groups with almost three times more likelihood of the disease occurrence in calves under 3 months than older age category(OR = 2.9, 95%CI = 1.0, 8.2). In conclusion, this study demonstrated the importance of Cryptosporidium in young ruminants with a higher prevalence among calves than lambs and kids.

Key words: Cryptosporidium, Prevalence, Risk Factors, Calves, Lambs, Kids, Haramaya, Ethiopia

*Alemayehu Regassa1, Tefera W/mariam1, Seble Demissie1, Nebyou Moje1, Dinka Ayana2 and Fufa Abunna1, 2012. Bovine Fasciolosis: Coprological, Abattoir Survey and Financial Loss Due to Liver Condemnation in Bishooftu Municipal Abattoir, Central Ethiopia, European Jour of Biological Sciences, 4(3): 83-90

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Abstract: A cross sectional study was conducted from November 2010 to April 2011 in Bishooftu Municipal Abattoir to estimate the prevalence of bovine fasciolosis, to assess the associated risk factors, to estimate the loss due to liver condemnation and to evaluate the sensitivity of coprological test. Thus, a total of 1151 cattle were randomly selected and subjected to coprological and detailed postmortem examinations and the prevalence report of 14.2% (164/1151) and 21.6% (249/1151) were recorded, respectively. The infection proportions of F.hepatica, F. gigantica and mixed infections were found to be 18.3%, 6.4% and 3.1%, respectively by postmortem examination. The highest prevalence was recorded in Bale (33%) followed by Chafe (32%) and Modjo (26%). Similarly, the fecal examination revealed the highest prevalence in Bale (29.6%) followed by Godino (17.9%), Chafe (17.2%), Arisi (16.9%) and Modjo (13.7%). It was observed that the likelihood of occurrence of fasciolosis in Bale (p = 0.010, OR = 3.3, 95%CI = 1.3, 8.3), Chafe (p = 0.000, OR = 3.2, 95%CI =1.9, 5.3), Godino (p= 0.041, OR = 1.9, 95%CI =1.0, 3.6) and Modjo (p =0.027, OR = 1.8, 95% =1.1, 3.1) was significantly higher than in Adama. Similarly, coprological examination revealed the higher chance of fasciolosis occurrence in Bale (p = 0.004, OR = 4.3, 95%CI = 1.6, 11.5) and Chafe (p = 0.016, OR = 2.1, 95%CI =1.2, 3.9) than its occurrence around Adama. Based on two proportions comparison test significantly ($X^2 = 21.44, p = 0.000$) higher prevalence by postmortem examination was recorded than by the coprology. The sensitivity and specificity of fecal examination were found to be 65.9% and 100%, respectively by substantial test agreement (kappa = 0.77) between the two techniques. The total financial loss per annum due to the condemnation of infected liver was found to be 232,232ETB (13,364.72USD). In conclusion, this study revealed the importance of bovine fasciolosis, the difference in occurrence at various areas and the significant loss due to liver condemnations which need strategic control measure to reduce its impact.

Key words: Fasciolosis, Cattle, Prevalence, Risk Factors, Financial Loss, Abattoir, Bishooftu, Ethiopia

*Alemayehu Regassa1, Asmelash Tassew1, Kebede Amenu1, Bekele Megeesa1, Fufa Abunna1, Berhanu Mekibib1, Tanguy Marcotty2 and Gobena Ameni3, 2010. A cross-sectional study on bovine tuberculosis in Hawassa town and its surroundings, Southern Ethiopia, Trop Anim Health Prod, 42: 915-920

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Abstract: A cross-sectional study was conducted in Hawassa town and its surroundings from October 2007 to May 2008 to estimate the prevalence of bovine tuberculosis (BTB) based on comparative Interadermal tuberculin test (CIDT) and abattoir survey. Accordingly, 39 herds comprising 413 cattle were subjected to CIDT, and the herd and individual animal prevalence were 48.7% (19/39) and 11.6% (48/413), respectively. One of the 16 milk samples collected from tuberculin-positive cows was culture positive. The prevalence significantly differed among the age group (P=0.001) and management system (P=0.001). Thus, age group over four (OR=7.9) and animal with poor management system (OR=4.1) had a higher odds for tuberculin reactivity compared to those with age group under four and cattle with good management system, respectively. Of the total 1,023 cattle subjected to postmortem examination, 11 (1.1%) were found to be positive for gross tuberculous lesions. Larger proportion (50%) of TB lesion was recorded in the respiratory pathway followed by digestive system (28.6%) and prescapular lymph nodes (21.4%). Of 14 tissue specimens collected from the gross lesions, four (28.6%) were positive for histopathological TB lesions. In conclusion, this study revealed the importance of BTB in the study area in particular and the region in general.

Keywords: Bovine tuberculosis, Prevalence, Tuberculin test, Postmortem, Southern Ethiopia

Lungworm infection in small ruminants: Prevalence and associated risk factors in Dessie and Kombolcha districts, northeastern Ethiopia, Veterinary Parasitology, 169: 144-148

Abstract: A cross-sectional study was conducted from November 2008 to March 2009 to estimate the prevalence of lungworm infection and to investigate some of the risk factors associated with small ruminant lungworm infections in Dessie and Kombolcha districts, northeastern Ethiopia. Faecal samples were collected from randomly selected 404 animals (240 sheep and 164 goats) to examine first stage larvae (L1) using modified Baerman technique. One hundred and thirty eight animals (113 sheep and 25 goats) were also subjected to postmortem examination to detect the presence of adult lungworm parasites. The overall prevalence recorded by faecal and postmortem examinations were 36.9% and 62.3%, respectively. Prevalence of lungworm infection was significantly higher (OR = 2.1, 95% CI = 1.2, 3.5) in sheep (40.4%) than in goats (31.7%). The proportions of infection by Dictyocaulus filaria (D. filaria), Mullerius capillaris (M. capillaris) and mixed infection were 1.3% (3/240), 28.3% (68/240) and 10.8% (26/240) in sheep; and 20.1% (33/164) by M. capillaris and 11.6% (19/164) with mixed infection in goats. Animals above one year (OR = 8.7, 95% CI = 4.8, 15.6), non-dewormed animals (OR = 10.4, 95% CI = 5.6, 19.3) and those sampled during November (OR = 3.6, 95% CI = 1.5, 8.6) had higher odds of infection prevalence than animals in corresponding groups. The mean count of L1 larvae of D. filarial and M. capillaris were 5.4 (95% CI = 3.6, 7.3) and 39.3 (95% CI = 33.7, 44.9) in ovine and 4.5 (95% CI = 3.1, 5.8) and 34.1 (95% CI = 27.2, 41.1) in caprine, respectively. The recorded average larval count of the two parasitic species varied significantly in both sheep and goats. This study showed high prevalence of lungworm infections which impairs the productivity of small ruminants, implying the need for control intervention.

Keywords: Lungworm, Prevalence, Risk factors, Small ruminant, Dessie and Kombolcha, Ethiopia

Major Metacestodes in cattle slaughtered at Wolaita Soddo Municipal abattoir, Southern Ethiopia: Prevalence, cyst viability, organ distribution and socioeconomic implications, Trop Anim Health Prod, 41: 1495-1502

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Abstract: A cross sectional study to determine the prevalence and socioeconomic importance of major metacestodes of cattle was conducted from November 2007 to April 2008 at Wolaita Soddo abattoir. Accordingly, of 415 randomly selected slaughtered cattle, 11.3% and 15.4% were infected with *Cysticercus bovis* and hydatid cysts, respectively. The anatomical distributions of these parasites include various organs. The major risk factors for cysticercosis prevalence were origin of the animals (P<0.001, OR=7.3) and breeds (P=0.004, OR=4.3), and hydatid cysts prevalence was significantly varied with different origins (P=0.021, OR=2.8). The viability of *C. bovis* was higher (28.3%) than that of hydatid cyst (1.7%). Of 79 interviewed respondents, 50.63% had acquired taeniasis and analysis of the risk factors showed association of religions (P=0.003, OR=24.4), occupation (P<0.001, OR=6.9), educational background (P=0.035, R=2.7) and age (P<0.001, OR=3.9) of the respondents with taeniasis prevalence. Furthermore, the inventory of taeniasis drugs dose and treatment cost were estimated to be 335,772 adult doses and 93,310 USD. In conclusion, the findings of the present study imply the zoonotic and socioeconomic importance of the diseases, which need intervention.

Key words: Abattoir, Questionnaire, Metacestodes, Prevalence, Cattle, Ethiopia

*Alemayheu Regassa*¹, Zinash Woldemicael¹, Kebede Amenu¹, Bekele Megersa¹, Fufa Abunna¹, Rahmeto Abebe¹, 2008. *Major Clinical Diseases Syndromes of Cows in Small holder Dairy Farms of Hawassa, Southern Ethiopia, Ethiopia Veterinary Journal, 13(1): 59-67

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Abstract: A retrospective study of two years (2006-2007) and prospective study of around three months (December 2007 – February 2008) were conducted in randomly selected 58 small holder dairy farms in Hawassa town, Southern Ethiopia. The objective of this study was to identify the major clinically manifested dairy cow diseases and to determine their incidence rate in the area. The retrospective study focused on the assessment of the general occurrence of major clinical events at herd level. In line with this, information regarding health problems observed in the farm during the past 2 years was gathered and accordingly, the highest frequency, relative percentage and herd prevalence of clinical mastitis (127, 35.2%, 87.9%) and pneumonia (62,17.2%,55.2%), retained fetal membrane (49,13.6%,44.8%), were recorded. The prospective study also indicated the highest incidence rate of clinical mastitis (15.6%) and pneumonia (12.7%) followed by inappetance (9.8%), lameness (3.9%). Statistical analysis revealed the significant difference in the occurrence of these clinical events among different age categories (p<0.05, CI=1.44-6.124) and parity (p<0.05, CI=1.08-5.28). Thus, the manifested clinical events of lactating cows were found to occur more likely in older cows (OR=3.34,CI=1.44-6.24) and cows with increased parity (OR=3.51,CI=1.08-5.28) when compared to younger cows and cows with lower parity number. This study suggests the need for improved animal health care to small holder dairy farms.

Key words: Retrospective and prospective study, Dairy farms, clinical diseases, Hawassa, Ethiopia.


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Abstract: A case control study was conducted between October 2004 and April 2005 to determine the prevalence of bovine tuberculosis (BTB) in cattle in central Ethiopia relative to the tuberculosis status of their owners. A total of 174 farmers (87 with active tuberculosis and 87 with no active tuberculosis), and 1041 cattle (506 owned by farmers with active tuberculosis and 535 by farmers without active tuberculosis) were included. The comparative intradermal cervical tuberculin test was used in cattle while clinical symptoms, chest X-ray and Ziehl-Neelsen staining were used for the diagnosis of tuberculosis in the farmers. In addition, mycobacterial culture, biochemical tests, and drug susceptibility tests were performed for the
identification Mycobacterium spp. from both humans and cattle. The prevalence of BTB was threefold higher (odds ratio [OR] = 4.2, 95% confidence interval [CI] = 2.79–6.2) in cattle owned by farmers with active tuberculosis (24.3%) than in those owned by farmers who did not have active tuberculosis (8.6%). Cattle owned by farmers with active tuberculosis were four times more likely to have tuberculosis than cattle owned by farmers with no active tuberculosis. Furthermore, cattle owners who consumed raw milk were at greater risk ($\chi^2 = 14.1, P < 0.001; \text{OR} = 3.34$) of having active tuberculosis than those who consumed boiled milk. Of the 42 human isolates, 31 (74%) were Mycobacterium tuberculosis, seven (16%) were *Mycobacterium bovis* while four (10%) were considered atypical mycobacteria on the basis of biochemical and drug sensitivity tests. Of the 11 cattle isolates, two (18%) were Mycobacterium tuberculosis, five (46%) Mycobacterium bovis, and four (36%) were atypical mycobacteria. The prevalence of tuberculosis was higher in cattle owned by farmers with active tuberculosis than in cattle owned by farmers who did not have active tuberculosis, which could suggest possible transmission of Mycobacterium spp. between cattle and their owners.

**Key words**: Bovine, Farmer, Mycobacterium, Prevalence, Risk factor, Tuberculosis


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**Abstract**: Single intradermal tests at cervical and caudal folds were evaluated on 107 zebu cattle at the same time. Test results were compared with detailed gross postmortem examination findings to estimate the sensitivity and specificity of the tests at the 2 sites. The sensitivity and specificity of a single intradermal tuberculin test at the cervical fold ranged from 33.3 to 83.3%, and 79 to 95%, respectively, while those at the caudal fold ranged from 33.3 to 50%, and 94 to 99% respectively. The result indicated that the sensitivity of single tuberculin test at cervical fold is significantly (chi-square test, $p<0.01$) higher than the sensitivity at the caudal fold. The specificity of the test at the caudal fold is significantly (chi-square test, $p<0.01$) higher than the specificity at the cervical fold. Therefore, under Ethiopian condition, it is advantageous to use the caudal fold in intensive farms where the prevalence of the disease is high and the cervical fold in extensive farms where the disease prevalence is relatively lower.

**Key words**: Caudal fold, Cervical fold, Tuberculous lesion, Tuberculin test


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**Abstract**: A cross sectional study was conducted from November 2010 to March 2011 to identify the major causes of organ condemnation in cattle slaughtered at Jimma municipal abattoir. An attempt was also made to estimate the direct economic loss due to condemnation of edible organs during meat inspection. A total of 900 cattle were examined by ante mortem and post mortem inspections using standard inspection procedures. During ante mortem inspection, the abnormalities encountered were blindness (0.11%), depression (0.55%), edema (0.11%), alopecia (0.11%), lameness (0.11%), leech infestation (0.22%), tick infestation (2.44%) and respiratory signs (0.11%). In the post mortem inspection, 580 (64.44%) of Livers, 416 (46.22%) of Lungs, 11 (1.22%) of Hearts and 18 (2.00%) of Kidneys were condemned due to gross abnormalities. An estimated annual loss of 172,664.09 ETB (US$10464.5) was incurred due to condemnation of these organs. Fasciolosis was found to account 92.7% of all the losses. The findings showed that the rate of organ condemnation at the abattoir is very high which signifies the need for prompt disease control programs to be implemented.

**Key words**: Organ, Condemnation, Ante Mortem, Post Mortem, Cattle

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**Abstract**: Camel hydatidosis was studied at Addis Ababa abattoir, Ethiopia to determine the prevalence and financial losses associated. From 501 camels slaughtered, 328 (65.47%) were found harboring hydatid cyst. The prevalence between females and males was statistically significant ($c^2=35.74; P=0.000$). Additionally, the disease was significantly different among the age groups ($c^2=18.71; P=0.00$) revealing higher prevalence in older animals. In respect to origin, the highest prevalence was observed from Borena (65.67%). The lung (47.90%) was the most frequently affected organ. Majority of the cysts identified were non calcified cysts. 57.78 and 39.10% of the cysts were found to be fertile in the lung and liver, respectively. Of these fertile cysts 68.27 and 60% were viable in the lung and liver, respectively. 212 lungs, 209 livers, 21 spleens and 2 hearts were totally condemned and these results in financial loss of 1089758.8 ETB (61222.4 US Dollar) annually. In conclusion, hydatidosis is highly prevalent in camels slaughtered at Addis Ababa Abattoir resulting to high economic loss due to organ condemnation. Thus, an effort should be made to control and prevent echinococcus in the camel herding areas.

**Key words**: Akaki abattoir, camel hydatidosis, financial loss, prevalence.


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**Abstract**: A cross-sectional study was conducted on selected camel herds of Borana lowland, southern Ethiopia. From a total of 560 camels examined, 97.7 and 25.9% were found infested with ticks of various species and *Sarcoptes* species. A total of 4636 adult tick species were collected from half-body regions of selected camels. The tick species identified and their relative abundance were as follows: *Rhipicephalus pulchellus* (69.6%), *Amblyomma gemma* (12.4), *Hyalomma dromedarii* (10.8%), *Boophilus decoloratus* (4.2%), *Amblyomma variegatum* (2.6%) and *Amblyomma lepidum* (0.4%). *Sarcoptes* species was the only mange mites observed during this study in Borana lowland. The overall half-body region observed mean tick burden was 48.4 ticks/camel. The total half-body regions mean tick burden was significantly higher in young males (1 to 3 years of age) with poor body conditions, large herd size (greater than 40 camels) and IN wet season. Also mixing camels with sheep and goats, and cattle significantly affect the mean half-body tick burden of camels. However, the impact of ticks and mange mites on host camel and the environment was not measured during this study; it was concluded that the number and species of infesting ticks and mange mites encountered were significant enough to pose a potential health hazard. Further research work on the seasonal pattern, biology and vector role for the ticks should be carried out in Borana lowland.

**Key words**: Ticks, risk factors, Boran, Ethiopia.


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**Abstract**: A cross sectional study was carried out from November 2009 to May 2010 in Hawassa town to estimate the overall prevalence, risk factors and major bacterial pathogens of mastitis in lactating dairy cows. A total of 245 cross breed lactating cows were examined clinically as well as by California mastitis test (CMT) to detect clinical and sub clinical mastitis. Milk from quarters showing positive result for clinical as
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well as sub clinical mastitis was subjected to bacteriological examination. From the total of 980 quarters examined 13 (1.3%) quarters were blind. Out of 245 lactating dairy cows and 980 quarters examined prevalence of 34.3% (84/245) at cow level and 20.4% (200/980) at quarter level was recorded. In this study, the prevalence of clinical and subclinical mastitis was 3.3% and 31.0% respectively. Bacteriological examination of mastitis positive quarters revealed Staphylococcus aureus (53.5%); Streptococcus agalactiae (26.5%); E. coli (12.5%); Klebsiella spp (2.5%) and Enterobacter spp (5%). This indicates contagious mastitis was predominant in the study area. The result of this study also showed older cows (> 6 years) and cows with udder injuries had significantly higher risk for mastitis. Therefore, culling of older cows and protecting udder from injury have to be practiced to reduce the risk of mastitis. Mastitis treatment response showed steady increase during the first week of post treatment period, while only slight changes were observed during the consecutive weeks, where, 57.2% and 42.9% treatment responses were achieved by short acting oxytetracycline (SAOTTC) and Penstrept, respectively. From this study further research to identify mastitis causing pathogens at molecular level and their association with potential risk factors and antimicrobial sensitivity of major bacterial pathogens in the area should be done.

Key words: Mastitis, Cows, Prevalence, Bacteriology, Treatment, CMT, Ethiopia

*Bekel Megersa1,2, Demelash Biffa1,2, Timketa Belina1, Etana Debela1, Alemayehu Regassa1, Fufa Abunna1 and Tesfaye Ruffael1, S.M. Stubssjen1, Eystein Skjerve2, 2011. Serological investigation of Peste des Petits Ruminants (PPR) in small ruminants managed under pastoral and agro-pastoral systems in Ethiopia, Small Rumen Research, 97: 134-138

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Abstract: A cross-sectional study to investigate Peste des Petits Ruminants (PPR) seroprevalence was conducted between October 2009 and April 2010 in Gambella and Afar regions of Ethiopia. A total of 1163 serum samples were collected from 251 sheep and 912 goats. Competitive Enzyme Linked Immunosorbent Assay (c-ELISA) was used to detect the presence of antibodies in the sera of animals as indicator of exposure to the PPR virus. The results showed an overall individual animal seroprevalence of 30.9% (359/1163) with 29.5% in sheep and 31.3% in goats. The disease affected 96.9% (22/23) of the villages in Gambella and all the villages (9/9) in the Afar regions. The intra-village prevalence records range was 8.3–42.9% and 32.6–54.8%, and 0–66.7% and 0–71.4% for sheep and goats in Afar and Gambella regions, respectively. The high village-level seroprevalence of PPR illustrates a remarkable contagious nature of the disease. Multivariable logistic regression analysis of exposure variables revealed a significant association of PPR seroprevalence with districts and sex. Accordingly, seroprevalence was significantly higher in Adar district of Afar (OR = 1.7, 95% CI: 1.1, 2.6) when compared to districts of Gambella region. Likewise, females were more likely to be seropositive (OR = 1.9, 95% CI: 1.2, 3.0) than their male counterparts. In conclusion, this study revealed a high seroprevalence and subsequent endemic establishment of PPR in small ruminants in the selected study areas. This disease is detrimental to small ruminant welfare and causes substantial economic losses, thereby affecting the livelihood of poor farmers and pastoralists. The need for implementing feasible control measures is, therefore, eminent to minimize the losses associated with the disease.

Key words: Peste des Petits Ruminants, Seroprevalence, Small ruminant, Ethiopia

*Bekel Megersa1,2, Demelash Biffa1,2, Fufa Abunna1, Alemayehu Regassa1, Jacques Godfroid3 and Eystein Skjerve2, 2011. Sero-prevalence of brucellosis and its contribution to abortion in cattle, camel, and goat kept under pastoral management in Borana, Ethiopia, Trop Anim Health Prod, 43: 651-656

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Abstract: The involvement of Brucella infection in causing abortion was investigated in a breeding female subpopulation of 283 cattle, 756 camels, and 757 goats. Serum samples were serially tested using the Rose Bengal test and complement fixation test. The study showed that anti-Brucella antibodies were prevalent in 10.6% (95% confidence interval (CI), 7.4, 14.9), 2.2% (95%CI, 1.4, 3.7), and 1.9% (95%CI, 1.1, 3.2) of cattle, camel, and goats, respectively. Abortion was more commonly reported in camels (23.4%) than cattle (13.8%) and goats (12.4%). The results of this study suggested that Brucella infections contribute significantly to abortion in cattle (odds ratio (OR),=4.7; 95%CI, 2.0, 10.8) and goats (OR=6.9; 95%CI, 2.2, 21.7) but not in camels. The number of young animals produced by breeding females seems to be apparently reduced in seropositive groups. Keeping more than two animal species at household level was found to be the risk factor for cattle (OR=3.1; 95%CI, 1.2, 7.9) and camel (OR= 5.3; 95%CI, 1.2–23.5) seropositivity to Brucella infection when compared to those animals from households that keep only two animal species. This may suggest a possibility of cross species transmission of Brucella infection under such mixed herding. Wet season (OR=4.8; 95%CI, 1.3, 18.1) was found to be associated with seropositivity in goats, linked to a coincidence of increased deliveries in flocks with possible excretion of Brucella organisms. The study results suggest that Brucella infection is the likely cause of abortion in cattle and goats while other causes largely outweigh brucellosis as a cause of abortion in camels in Borana, hence, contributing to reproductive loss.

Key words: Brucellosis, Seroprevalence, Abortion, Cattle, Camel, Goat, Ethiopia

*Bekete Megersa¹, Demelash Biffa¹, Fufa Abunna², Alemayehu Regassa¹, Jon Godfroid³ and Eystein Skjerve⁴, 2012. Seroepidemiological study of livestock brucellosis in a pastoral region, Epidemiol. Infect., 140: 887-896

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Abstract: A seroepidemiological study of Brucella infections in multiple livestock species in the Borana pastoral system of Ethiopia was performed between December 2007 and October 2008. A cross-sectional multi-stage sampling technique was employed to select 575 cattle, 1073 camels and 1248 goats from the target populations. Sera were collected from the animals, and serially tested using Rose Bengal test and complement fixation test. Overall prevalence and prevalence with respect to explanatory variables were established, and potential risk factors for seropositivity were analysed using a multivariable logistic regression. The results showed that 8.0% (95% CI 6.0–10.6), 1.8% (95% CI 1.1–2.8) and 1.6% (95% CI 1.0–2.5) of the tested cattle, camels and goats, respectively, had antibodies to Brucella antigen. Positive reactors were found in 93.8% of the villages with more frequent detection of positive cattle (93.3%) than camels (56.3%) and goats (37.5%). Risk factors identified for cattle were: keeping more livestock species at household level (OR 4.1, 95% CI 1.9–8.9), increasing age of the animal (OR 2.8, 95% CI 1.3–6.0) and wet season (OR 3.3, 95% CI 1.6–6.9). Increase in household-level species composition (OR 4.1, 95% CI 1.2–14.2) and wet season (OR 3.7, 95% CI 1.5–9.1) were found to be risk factors for seropositivity in camels and goats, respectively. Existence of more than one seroreactor animal species in most villages and association of increased livestock species composition with seropositivity may add more credence to the possibility of cross-species transmission of Brucella infections. Although no attempt to isolate Brucella spp. was made, our results suggest that cattle are more likely maintenance hosts of Brucella abortus which has spread to goats and camels. This should be substantiated by further isolation and identification of Brucella organisms to trace the source of infection and transmission dynamics in various hosts kept under mixed conditions. In conclusion, the present study suggests the need for investigating a feasible control intervention and raising public awareness on prevention methods of human exposure to brucellosis.

Key words: Brucellosis, Ethiopia, livestock, pastoral system, prevalence, risk factors.

*Bekete Megersa¹, Demelash Biffa¹, Fufa Abunna¹, Alemayehu Regassa¹, Jacques Godfroid² and Eystein Skjerve², 2012. Epidemic characterization and modeling within herd transmission dynamics of an “emerging trans-boundary” camel disease epidemic in Ethiopia, Trop Anim Health Prod, 44:1643-1651

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Abstract: A highly acute and contagious camel disease, an epidemic wave of unknown etiology, referred to here as camel sudden death syndrome, has plagued camel population in countries in the Horn of Africa. To better understand its epidemic patterns and transmission dynamics, we used epidemiologic parameters and differential equation deterministic modeling (SEIR/D-model) to predict the outcome likelihood following an exposure of susceptible camel population. Our results showed 45.7, 17.6, and 38.6 % overall morbidity, mortality, and case fatality rates of the epidemic, respectively. Pregnant camels had the highest mortality and case fatality rates, followed by breeding males, and lactating females, implying serious socioeconomic consequences. Disease dynamics appeared to be linked to livestock trade route and animal movements. The epidemic exhibited a strong basic reproductive number (R0) with an average of 16 camels infected by one infectious case during the entire infectious period. The epidemic curve suggested that the critical moment of the disease development is approximately between 30 and 40 days, where both infected/exposed and infectious camels are at their highest numbers. The lag between infected/infectious curves indicates a time-shift of approximately 3–5 days from when a camel is infected and until it becomes infectious. According to this predictive model, of all animals exposed to the infection, 66.8 % (n = 868) and 33.2 % (n=431) had recovered and died, respectively, at the end of epidemic period. Hence, if early measures are not taken, such an epidemic could cause a much more devastating effect, within short period of time than the anticipated proportion.

Key words: Contagious disease, Camel sudden death, Differential equation

Bekele Megersa1, Eliyas Tesfaye1, Alemayehu Regassa1, Rahmeto Abebe1 and *Fufa Abunna1, 2010. Bovine cysticercosis in Cattle Slaughtered at Jimma Municipal Abattoir, South western Ethiopia: Prevalence, Cyst viability and Its Socio-economic importance, Veterinary World, 3(6): 257-262

Abstract: A cross sectional study was conducted during November 2008 to March 2009 to estimate the prevalence of Cysticercosis in animals, Taeniasis in human and estimate the worth of taeniasis treatment in Jimma town. Active abattoir survey, questionnaire survey and inventory of pharmaceutical shops were performed to accomplish the study. Of the total of 500 inspected animals, 22 animals had varying number of C. bovis giving an over all prevalence 4.4% (22/500). Anatomical distribution of the cyst showed that highest proportions of C. bovis cyst were observed in shoulder muscle, followed by tongue, heart and masseter muscle. Of the total of 114 C.bovis collected during the inspection, 49(42.9%) were found to be a live while others (57.0%) were degenerative cyst. Of the total 60 interviewed respondents, 56.7% (34/60) had contracted T.saginata infection, of which, 95% and (5%) cases reported using modern drugs and traditional drugs, respectively. The majority of the respondent had an experience of row meat consumption as a result of traditional and cultural practice. Human Taeniasis prevalence showed significant difference (p<0.05) with age groups, meat consumption, sex and use of spice. Accordingly adult individual (OR=47.4), frequent raw meat consumers (OR=18.4), spice users (OR=7.0) and male (OR=5.0) had higher odds acquiring Taeniasis than children, occasional meat consumer, non spice users and females, respectively. In this analysis there was no significance difference between religion, education status, occupational risks and marital status (p>0.05). An inventory of pharmaceutical shops (pharmacies, drug stores and rural drug vendors) revealed a total of 103,596 adult taeniacidal drug doses worthing a total of 222,706 Eth. Birr (22,270.6 USD) during two years of 2007 and 2008.Vermox and Niclosamide were the most frequently sold drug for the treatment of taeniasis, while Praziquantel was least sold drug. The findings of this study including prevalence of C. bovis, questionnaire survey of taeniasis prevalence and the pharmaceutical shops inventory indicated the importance of Cysticercosis and Taneniasis both in public health and economical aspects. Therefore, due attention should be given to the public awareness and strict routine meat inspection in order to safe guard the public health.

Keywords: Abattoir, C.bovis/Taeniasis, Cattle, Prevalence, Ethiopia
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*Bekele Megersa¹, Chala T¹, Fufa Abunna¹, Alemayehu Regassa¹, Berhanu Mekibib¹ and Etana Debele¹, 2010. Occurrence of mastitis and associated risk factors in lactating goats under pastoral management in Borana, Southern, Ethiopia, *Trop Anim Health Prod*, 42: 1249-1255

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**Abstract**: Mastitis prevalence and related risk factors were studied in 1,072 udder halves of 536 lactating goats from October, 2008 to February, 2009. Clinical and subclinical mastitis were prevalent in 4.3% (95% CI=2.8, 6.5) and 11.2% (95% CI=8.7, 14.3) of the studied animals, respectively, resulting in an overall prevalence of 15.5% (95% CI=12.6, 18.9). Univariate analysis of the potential risk factors has depicted that mastitis was more prevalent in does with previous mastitis history, increased parity, poor body conditions, increased milk production, late lactation stage, long teat, and housed goats. Furthermore, prevalence was significantly higher (p<0.05) during the wet period of October to November than the dry periods of January to February. No significant variations (p>0.05) were observed in mastitis prevalence with udder tick infestation, mixing goat with sheep and flock size. With multivariable analysis, lactation stage, teat length, body condition, and season (wet months) have showed significant association with mastitis prevalence, and these factors maintained significant in the stepwise elimination of multivariable logistic regression model. As a result, does in late stage of lactation (OR=4.3, 1.8, 10.4), poor body condition (OR=5.0, 1.7, 10.0), long teats (OR=2.2, 95% CI=1.1, 4.2) and does examined in wet period were at higher risk of udder infections than early lactation, good body condition, short teat, and examined in dry period, respectively. The study showed occurrence of mastitis and associated risk factors in studied goats, which suggests the need for control intervention. Further investigations into pathogens involved in goat mastitis will optimize our knowledge of causative agents and control interventions.

**Key words**: Goats, Mastitis, Clinical, Subclinical, Prevalence, Risk factors, Borana, Ethiopia

*Bekele Megersa¹, Desta Beyene², Fufa Abunna¹, Alemayehu Regassa¹, Kebede Amenu¹ and Tesfaye Rufael³, 2009. Risk factors for foot and mouth disease seroprevalence in indigenous cattle in Southern Ethiopia: the effect of production system, *Trop Anim Health Prod*, 41: 891-898

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**Abstract**: A serological survey to investigate risk factors for Foot and Mouth Disease (FMD) occurrence was conducted between October 2007 and March 2008 in Southern Ethiopia. Antibodies against non-structural protein of FMD virus (using 3abc ELISA) were measured as indicator of exposure to the virus. The seroprevalence of FMD was 9.5% (95% CI=7.7 – 11.3, n=1020) and 48.1% (95% CI= 36.8 – 59.4%, n=79), respectively at animal and herd levels. Within herd seropositivity was ranged from 6.7 to 46.7% with 18.6% (95% CI=14.6 – 22.5%) risk of being seropositive for an animal in positive herds. The most important herd level risk factors identified were pastoral system (OR=16.3, 95% CI=2.0 -133.7) compared to sedentary, low altitude (OR=7.5, 95% CI 1.4 -40.7) compared to high altitude, keeping cattle with small ruminants (OR=5.1, 95%CI 1.0 -25.2) when compared to one species or alone. Seroprevalence was significantly higher (P <0.05) in South Omo than Sidama and Gamo Gofa areas. The odds of seropositivity were 2.8 and 2.3 times higher in the adult (>4 years) and maturing animals (3–4 years) compared to young age category (<3 years). Both multivariable logistic and negative binomial regressions depicted that production system was the major risk factor for FMD seropositivity. Consequently, higher prevalence of FMD in pastoral system where animals are an integral part of life has substantial livelihood and economic implications, which signifies the need for devising control measures.

**Key words**: Cattle, FMD, ELISA, Risk factors, Seroprevalence, Ethiopia

*Bekele Megersa¹, Alemayehu Regassa¹, Bersissa Kumsa¹ and Fufa Abunna¹, 2008. Performance of camels (Camelus dromedrius) kept by pastoralists with different degrees of experience in camel keeping in Borana, Southern Ethiopia, *Animal Science Journal*, 79: 534-541

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Abstract: The aim of the present study was to investigate the performances of camels kept by pastoralists with different degrees of experience in camel production. The study was conducted on 60 selected camel herds twice a year; during wet and dry seasons of 2003 and 2004 in Borana, Southern Ethiopia. The average ages at first parturition and calving intervals of breeding females were 68.1 ± 0.5 and 25.5 ± 0.4 months (LSMean ± SE), respectively. Age at first parturition was significantly reduced by use of veterinary services, while variation was not observed among Borana, Guji, Gabra and Somali herds. Calving intervals were significantly shorter ($P < 0.05$) in Borana (24.8 ± 0.6) and Guji (24.5 ± 1.5) than Somali herds (27.0 ± 0.5). Calving intervals were also prolonged ($P < 0.05$) by fixing breeding time. Annual calving, abortion and calf mortality rates were similar for the four populations and averaged 37.3%, 9.3%, 20.3% in 2003, and 41.3%, 8.2%, 14.9% in 2004, respectively. The overall mortality rate was significantly higher ($P < 0.05$) in Borana (10.0 ± 2.1) than in Gabra herds (4.2 ± 0.8). However, mortality was not statistically different for use of veterinary services and other managemental practices. The study showed an increase in annual herd growth by 5.7% in 2003 and 11.6% in 2004 with similarity of herd dynamics between the two years. Daily milk yield differed significantly ($P < 0.05$) depending on veterinary services, watering frequency and the season (7.6 L during wet and 4.3 L during dry season). Similarly, milk yield was significantly higher ($P < 0.01$) in Somali herds than in Borana and Gabra herds. In conclusion, the study revealed that some production and reproduction performances in camel herds have showed significant variation with varying levels of herding experience and veterinary services. This may suggest performance in pastoral camels can be enhanced with learning more about and using traditional management practices as well as improving animal health service delivery.

Key words: Camels, experiences, herd dynamics, pastoral ethics, performances.

*Bekele Megersa¹, Abduba Yakob¹, Alemayheu Regassa¹, Fufa Abunna¹ and Kebede Amenu¹, 2008. Prevalence and incidence rates of calf morbidity and mortality and associated risk factors in small holder dairy farms In Hawassa, Southern Ethiopia, Ethiopian Veterinary Journal, 13: 59-68

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Abstract: An investigation on the prevalence and incidence of calf mortality and morbidity and on associated risk factors was conducted on 48 purposely selected dairy farms in Hawassa town. A total of 140 calves from all selected farms were recorded and longitudinally monitored from September, 2007 to April, 2008 for major health problems and associated risk factors. The overall crude morbidity and crude mortality rates were 29.3% and 9.3%, respectively. The most frequent disease syndrome was diarrhea with incidence rates of 10% followed by septicemia (6.4%) and Gastro-intestinal tract (GIT) disorder (5.4%). In addition skin lesion, traumatic injury, pneumonia and unidentified cases were encountered. The main causes of deaths were diarrhea (2.9%), Septicemia (2.1%), GIT disorder (1.4%), Pneumonia (0.7%), accidental loss (0.7%) and unidentified causes (1.4%). The most important risk factors associated with morbidity were housing condition, use of bedding materials, farm size and calf sex. Whereas, important risk factors associated with mortality were floor conditions, calf housing especially flour conditions, and calf factors were identified as major risk factors for disease occurrence and mortality. Thus, improving management practices including hygienic conditions and animals health care are recommended to alleviate the health problems of smallholder dairy calves with subsequent improvement of survival rate.

Key words: Dairy calves, Calves, Morbidity, Mortality, GIT parasite, Risk factors, Hawassa

*Bekele Megersa¹, André Markemann², Ayana Angassa³ ⁴ and Anne Valle Zárate², 2014. The role of livestock diversification in ensuring household food security under a changing climate in Borana, Ethiopia, Food Security, 6:15-28

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Abstract: While food insecurity is a growing concern across the developing nations, accentuated by climate variability and change, it could be even worse for pastoralists given their unpredictable exposure to climate risks. The Borana herders experience food insecurity as a result of recurring droughts causing huge losses of cattle, and are thus increasingly shifting from cattle pastoralism to multi-species herding. The present study examines the role of livestock diversification in combating household food insecurity using herders’ perceptions, a modified household food insecurity access scale (mHFIAS) and dietary diversity score. Herders perceived child growth, adult height and body condition to be decreasing as a result of declining milk production and changing dietary trends. Results also revealed a high level of seasonal food insecurity and low dietary diversity with the majority (81%) consuming one to three food groups. Livestock diversification was a major factor affecting household food security. Households practising diversification had significantly fewer months of food deficit (2.3 vs. 3.8), lower mHFIAS (5.5 vs. 8.7) and a higher average off-take in the form of livestock sales (7.4 vs. 4.0) than non-diversified ones. Diversification improved dietary intake of specific food groups and the average number of meals consumed per day. While fruits, eggs and fish are not part of the Borana diet, a large number of respondents consumed no vegetables (93%) or meat (96%), potentiating the risk of micronutrient deficiencies. This study highlights the particular significance of livestock diversification, among other socio-demographic factors, in attaining food security under a changing climate in the study area.

Key words: Climate variability, Dietary diversity, Food insecurity, Livestock diversification, Borana

*Bekele Megers¹², André Markemann², Ayana Angassa³⁵, Joseph O. Ogutu⁴⁶, Hans-Peter Piepho⁴ and Anne Valle Zarate⁵, 2014. Impacts of climate change and variability on cattle production in southern Ethiopia: Perceptions and empirical evidence, Agricultural Systems, 130: 23-34

Abstract: Climate change and variability can severely constrain the productivity of pastoral herds by reducing water availability, forage production and quality, and hence the carrying capacity of rangelands. In particular, the risk of heavy livestock losses suffered during recurrent severe droughts associated with climate change and variability presents one of the most serious threats to pastoral livestock keepers. To generate insights into how climate change and variability adversely affect cattle production in the Borana of southern Ethiopia, we analyzed perceptions of herders and long-term changes in cattle numbers and climate data. A total of 242 households were surveyed to generate data on perceived trends in climate, rangeland condition and livestock production. Socio-demographic characteristics of households and cattle mortality due to the 2010/2011 drought were also recorded. Using a local time calendar, cattle herd history was reconstructed for a period spanning five major droughts to portray the linkage between changes in cattle numbers and changes in rainfall and temperature. Most of the herders perceived that rainfall has become more unpredictable, less in amount and shorter in duration, while drought recurrence and temperature have increased. Similarly, the majority perceived a decreasing trend in cattle herd sizes and their production performances. The 2010/2011 drought was associated with a substantial decline in cattle herd sizes due to increased mortality (26%) and forced off-take (19%). Death occurrences and mortality rates varied significantly by district, herd size and feed supplementation. Spectral density analysis revealed a quasi-periodic pattern in the annual rainfall with an approximate cycle period of 8.4 years, suggesting that droughts recur approximately every 8.4 years. A downward trend in cattle population mirrored a similar underlying trend in the interannual rainfall variation. Accordingly, changes in cattle number were significantly linked with changes in rainfall. In conclusion, perceptions corroborated by empirical evidences showed that climate

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change and variability were associated with declining cattle numbers, portending a precarious future to the sustainability of cattle pastoralism in southern Ethiopia and other pastoral systems.

**Key words**: Climate change, Drought, Rainfall variability, Cattle vulnerability, Pastoral system, Borana


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**Abstract**: Pastoral cattle production in southern Ethiopia is becoming increasingly vulnerable to impacts of climate variability and rangeland resource degradation, giving rise to livestock diversification. Using a household (n=242) survey among herders, the relative functions, adaptability and vulnerability of four livestock species and factors influencing live-stock diversification were analyzed. The stated major drivers of livestock diversification were recurrent droughts, bush encroachment, increased vulnerability of cattle and growing demand for adaptive species. Different livestock species are kept to fulfill various livelihood priorities with subsistence objectives outweighing production goals of the herders. Adaptability and vulnerability analyses of the livestock species showed camels and cattle to be the most and least adaptable species, respectively. Livestock species diversification varied significantly with family size and per capita holding of cattle, implicating the influence of labor and economic factors on adoptions. Multispecies herding emerged as the dominant local adaptation strategy, likely because it enhances resilience of households to climate and rangeland ecosystem changes by broadening the set of existing strategies.

**Key words**: Adaptation, Environmental changes, Multispecies herding, Production objectives, Borana, Ethiopia


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**Abstract**: A study conducted to estimate the prevalence of gastrointestinal helminth of scavenging chicken in villages around Hawassa, Southern Ethiopia, from October 2010 to April 2011. A total of 360 faecal samples and 122 postmortem examination were conducted. The overall postmortem and coproscopic prevalence of scavenging chicken gastrointestinal helminthes (GIT) were 88.5% and 77.8%, respectively. In the examined scavenging chicken about 67.5% and 29.2% of the chickens were positive for nematodes and cestodes species, respectively. The postmortem examination revealed 51.6% infection with *Heterakis gallinarum* followed by *Ascarida galli* (45.9%), *Raillietina tetragona* (20.5%), *Raillietina echinobothrida* (17.2%), *Capillaria species* (13.1%), *Raillietina cesticillus* (8.2%) and *Hymenolepis cantanian* (3.3%). There was a significant difference in the overall prevalence of GI helminth parasites observed between male and female and between age groups of chickens (*P <0.05* and *P < 0.01*, respectively). Hence, emphasis should be given to control poultry helminthosis both by producers and animal health professionals.

**Key words**: Helminth, Coproscopy, Scavenging, Poultry, Ethiopia

Berhanu Mekbib¹, Habtamu Abesha and *Dawit Tesfaye¹, 2013. Study on Zoonotic Metacestodes of Cattle Slaughtered at Bahir Dar Municipal Abattoir, Northwest Ethiopia, *Global Veterinaria*, 10(5): 592-598

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Abstract: A cross sectional study was conducted from November 2010 to March 2011 to estimate the prevalence of the major metacestodes of cattle slaughtered at Bahir Dar municipal abattoir. Out of 465 randomly selected slaughtered cattle, 12 (2.58%) and 148 (31.8%) were infected with Cysticercus bovis and Hydatid cyst, respectively. The prevalence of Cysticercus bovis was significantly different between castrated and uncastrated cattle. However, there was no significant difference for the prevalence of Cysticercus bovis among the different origins and management systems ($p>0.05$). There was also no marked difference in the prevalence of hydatid cyst in cattle among the different origins ($p>0.05$). In contrast, the difference in the prevalence of the hydatid cyst between the different management systems was found to be statistically significant ($p<0.05$). Similarly, the prevalence of hydatid cyst was statistically significant between castrated and uncastrated cattle ($p<0.05$). Regarding organ distribution, tongue and masseter muscle were the most frequently infected organ with Cysticercus bovis. Whereas, lungs took the highest proportion among the other organs infected with hydatid cyst. The viability test of the metacestodes of cattle showed that 33.9% of Cysticercus bovis and 20% of the examined hydatid cyst were viable. In a nutshell, the finding of the present study reflects a visible reduction in the prevalence of Cysticercus bovis from the previous years and still a higher prevalence in hydatid cyst. Therefore, serious attention should be given by various stakeholders to break the life cycle of both metacestodes and hence reduce their impact on the public health.

Key words: Metacestode, Cattle, Prevalence, Abattoir, Bahir Dar


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Abstract: Abattoir based study was conducted to assess the type and prevalence of reproductive abnormalities and pregnancy status of cows slaughtered at Hawassa municipality abattoir and Tula slaughter house. Out of the 345 genital tracts examined, one or two gross abnormalities with different degrees of severity were observed in 124 (35.9%) of genital tracts. The most common abnormalities encountered were ovario bursal adhesions (6.38%, $n=22$), endometritis (4.93%, $n=17$), and follicular cysts (4.35%, $n=15$). On anatomical basis, ovarian abnormalities (14.78%, $n=51$) were more frequent followed by uterine (10.43%, $n=36$), cervico-vaginal (7.25%, $n=25$) and oviductal (4.93%, $n=17$) abnormalities. Both breed and study area showed no statistically significant effect in the prevalence of reproductive abnormalities. Pregnancy was recorded in 26.67% ($n=92$) of the slaughtered cows, of which 45.65% ($n=42$) were in the first trimester, while 30.43% ($n=28$) and 23.91% ($n=22$) in the second and third trimesters, respectively. The current study revealed that reproductive tract abnormalities are important diseases in the study areas with considerable impact on the reproductive performance of cows. Moreover, the large number of cyclical (36.52%) and pregnant cows (26.67%) slaughtered without any gross abnormalities indicates the absence of proper gynecological examination prior to slaughtering.

Key words: Reproductive abnormalities, genital tract, slaughter, cows, Hawassa, Tula.


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Abstract: The prevalence of gastrointestinal helminthes in dogs was investigated by faecal examination from 860 dogs employing direct smear, simple flotation and sedimentation techniques. A structured questionnaire was also completed by 476 owners to assess the public awareness of zoonotic helminthes transmitted by dogs. Of the 860 dogs examined 768 (89.3%) were found to be positive for different types of helminth eggs. The following helminthes, with their respective prevalence, were diagnosed: *Strongyloides* species (60.1%), *Ancylostoma* species (52.2%), *Dipylidium* species (40.6%), *Toxocara* species (23.3%), *Echinococcus* species (5.8%) and *Trichuris* species (4.9%). The prevalence of gastrointestinal helminthes were significantly affected by age ($P<0.001$), sub-city ($P<0.05$) and confinement types ($P<0.001$). Higher prevalence of gastrointestinal helminthes was recorded in younger dogs less than one year of age (95.6%, CI = 93.1 to 98.0).
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98.2). Free-roaming and semi-confined dogs were harboring significantly higher prevalence of helminthes (100%) than strictly confined dogs (62.6%, CI = 56.5 to 68.7). The present study reported that 99.2% of dog owners were not aware of the zoonotic parasite transmitted by dogs and 88.2% of them never used anthelmintics for treatment of their dogs. The high prevalence of gastrointestinal helminth parasites of dogs and lack of owners’ awareness in Hawassa indicates a potential risk to human health. Thus, serious attention by the veterinarians, municipality of the town and public health service to increase awareness of their potential threat to human health is desirable.

Key words: Helminth, dogs, prevalence, zoonoses, Hawassa.

Berhanu Mekbib¹, Muluken Furgasa¹, Fufa Abunna¹, Bekele Megersa¹ and *Alemayheu Regassa¹, 2010. Bovine Mastitis: Prevalence, Risk Factors and Major Pathogens in Dairy Farms of Holeta Town, Central Ethiopia, Veterinary World, 3(9): 397-403

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Abstract: A cross sectional study was carried out from November 2008 to April 2009 to estimate prevalence of mastitis and to see associated bacterial pathogens in lactating dairy cows in Holeta town. A total of 107 cross bred milking cows were tested using California Mastitis Test (CMT). Prevalence of mastitis at cow level was 71.0% (76/107), out of which 22.4% (24/107) and 48.6% (52/107) were clinical and subclinical, respectively. The quarter level prevalence was 44.9% (192/428); from this the clinical and subclinical forms were 10.0% (43/428) and 34.8% (149/428), respectively. Out of the 43 quarters with clinical cases, 31 had blind teats while 12 of them revealed active cases of mastitis. Samples from all 12 active clinical cases and 90.0% (134/149) of the CMT positive subclinical quarters were found to be culture positive. From 146 culture positive samples, a total of 153 bacteria were isolated, the most prevalent being S. aureus (47.1%) followed by Coagulase negative Staphylococcus (CNS) (30.1%). Other bacterial isolates included Streptococcus (7.2%), E.coli (4.6%), Micrococcus species (3.3%), Klebsella pneumonae (3.3%), Enterobater aerogen (1.3%), Corynebacterium species (2.0%) and Bacillus (1.3%). Risk factors analysis revealed that prevalence significantly differed with the age (P < 0.05), parity (P < 0.05) and udder hygiene condition (P < 0.03). Thus, prevalence was relatively higher in adult cows (OR = 2.0;95% CI = 1.15, 3.64), cows with moderate calves (OR = 2.4;95% CI = 1.6, 3.6), cows with injured teat (OR = 7.7, 95%CI = 0.9, 64.1) and cows with unwashed udder (OR = 2.3, 95% CI = 0.8, 6.4) than those corresponding animals. In conclusion, this study revealed the importance of mastitis and associated bacterial pathogen in the study area.

Key words: Bovine mastitis, prevalence, risk factors, major pathogens, central Ethiopia

Berhanu Mekbib¹, Mesfin Manegerew¹, Abebayehu Tadesse¹, Fufa Abunna¹, Bekele Megersa¹, Alemayehu Regassa¹, Solomon Mekuria¹ and *Rahmeto Abebe¹, 2010. Prevalence of haemoparasites and associated risk factors in working donkeys in Adiguem and Kwiha districts of Tigray region, Northern Ethiopia, Journal of Animal and Veterinary Advances, 9(17): 2249-2255

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Abstract: A cross-sectional study was conducted from November 2008 March 2009 in Adigudem and Kwiha district in Tigray regional state, with the objectives of identifying the prevalence of haemoparasites and the associated risk factors in working donkeys. Blood samples were collected from a total 400 randomly selected donkeys and examined by dark ground/phase contrast buffy coat technique and Giemsa stained blood smears. The overall prevalence of haemoparasites was found to be 2.5% (n=10) without significant variation between the two districts (q>0.05). Two genera of haemoparasites namely Babesia and Trypanosomes were observed with the prevalence of 1.75% (n=7) and 0.75% (n=3), respectively. Two species of Babesia were identified: Babesia equi (71.43%) and Babesia caballi (28.6%) while Trypanosoma vivax was the only trypanosome encountered during the study period. No significant association was observed between the prevalence of either of the two haemoparasites and the hypothesized risk factors (study area, sex, age and body condition score) (q>0.05 for all factors). The mean packed cell volume (PCV) of trypanosome infected donkeys (20.67±4.04) was significantly (p<0.05) lower than that of non-infected
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donkeys (28.68+5.73); however, no significant difference was observed between Babesia positive and Babesia free animals (q>0.05). In conclusion, the prevalence of haemoparasites observed in the current study is generally low compared to previous studies. As the present study design was a cross-sectional one that only depicts a momentary picture of the infection status in the herd, a further longitudinal study that makes use of molecular techniques is recommended.

**Key words**: Adigudem, Donkeys, Haemoqarasite, Kwiha, prevalence, risk factors, Ethiopia.

*Bersissa Kumsa*¹, Adugna Tolera² and Ajebu Nurfeta², 2010. Comparative efficacy of seven brands of albendazole against naturally acquired gastrointestinal nematodes of sheep in Hawassa, southern Ethiopia, *Turkish Journal of Veterinary and Animal Sciences*, 34(5): 417-425

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**Abstract**: This study aimed to evaluate the efficacy of 7 brands of albendazole against gastrointestinal nematodes in naturally infected sheep in southern Ethiopia. The study included 120 local breed male sheep purchased in Hawassa. The sheep were divided into 8 groups of 15 animals each. Group 1 served as the untreated control, whereas groups 2-8 were treated with ABZ1, ABZ2, ABZ3, ABZ4, ABZ5, ABZ6, and ABZ7, respectively. Fecal samples were collected before treatment on day 0, and again on post-treatment day 12. The efficacy of all 7 brands of albendazole was determined on post-treatment day 12 based on the fecal egg count reduction test (FECRT). The results of the study show that the efficacy of 5 brands was good, whereas that of the other 2 brands was low. The observed differences in efficacy between the brands of albendazole were most likely due to variations in quality rather than the administered doses. Coprocultures from all pre- and post-treatment samples showed a predominance of *Haemonchus* spp. Results of a questionnaire survey indicated that the benzimidazoles are the most widely used anthelmintic family, followed by the imidazothiazoles and macrocyclic lactones. In addition, it showed that farmers in the study area were engaged in several practices that may be responsible for lowering the efficacy of anthelmintics. Additional detailed studies are required to clarify the current status of the efficacy of the anthelmintics widely used in different agroecologies, animal species, and livestock management systems in Ethiopia.

**Key words**: Albendazole brands, efficacy, sheep, helminths, Hawassa


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**Abstract**: A study was conducted to determine the presence of anthelmintic resistance on Hawassa University goat farm in southern Ethiopia. The 180 goats were stratified by age and sex and randomly assigned to treatment groups (albendazole, tetramisole and ivermectin and untreated control). Each treatment group included 15 goats and treatments were administered according to weight of each goat with 7.5 mg/kg bw albendazole, 22.5 mg/kg bw tetramisole and 0.2 mg/kg bw ivermectin dose rates recommended by scientists. Faecal samples were collected on day 0 before treatment, and again on day 12 post treatment. Efficacy of all the drugs was assessed on day 12 post treatment by faecal egg count reduction test (FECRT). Multiple anthelmintic resistance in *Haemonchus* spp. against albendazole, tetramisole and ivermectin was recorded in all age categories of the goats. Likewise, *Trichostrongylus/Teladorsagia* spp. showed resistance against ivermectin. Coprocultures from all pre- and post-treatments revealed the predominance of *Haemonchus* spp. Resistance against anthelmintics is attributed to the high frequency of treatment and low dosage of treatment practices on the farm. Large scale studies, however, are needed to assess the current status of anthelmintic resistance against the most commonly used anthelmintics in different agroecology, species of animals and management systems in Ethiopia.
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**Key words:** Haemonchus spp., Ogaden, small ruminants, vulvar morphology


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**Abstract:** A study was carried out to determine the type of vulvar process of 3187 and 2386 female Haemonchus worms recovered from naturally infected sheep and goats respectively, during the period from August 2003 to March 2004. In addition a total of 1159 adult male Haemonchus worms from sheep and 1285 from goats were subjected to a species identification study. The study revealed that out of the total female worms from sheep 49.5% linguiform, 28.5% knobbled and 23% smooth vulvar morph types were identified. Likewise, from goats 53.8% linguiform, 18.5% knobbled and 27.6% smooth vulvar morph types were identified. Significant variations (P<0.05) were observed in proportions between the three major vulvar morph types in different months of the study period in both host species. Further sub-classification of the linguiform female worms from sheep revealed 27.2% linguiform A (LA), 14.8% linguiform B (LB), 5.3% linguiform C (LC) and 2.2% linguiform I (LI) subtypes. Similarly from goats 27.4 % LA, 17.5% LB, and 6.6% LC and 2.3% LI subtypes were identified. Within the linguiform vulvar flap types, the A subtype linguiform showed statistically significant (P<0.05) fluctuation during the months of study period in both host species. Haemonchus species identification based on morphometric parameters on spicules of 1159 adult male Haemonchus from sheep revealed 95.1% H. contortus, 3.5% H. placei and 1.5% H. longistipes, while out of 841 mature male Haemonchus from goats, 96.6% H. contortus, 2.9% H. placei and 0.5% H. longistipes were identified. The study showed 57.9% H.contortus mono-species, 22.4% H. contortus and H. placei mixed infection, 7.9% H. longistipes and H. placei mixed infection and the rest 11.8% H. contortus, H. placei and H. longistipes triple infection of the examined sheep. A questionnaire survey conducted to gather information on methods of sheep nematode control practices in the

**Key words:** Haemonchus spp., Ogaden, small ruminants, vulvar morphology


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**Summary:** The efficacy of two brands of each of albendazole, tetramisole and ivermectin was tested against gastrointestinal nematodes in naturally infected sheep in Hawassa (southern Ethiopia). One hundred and five male sheep were divided into seven groups of 15 animals; the 1st group served as the untreated control, the 2nd was treated with albendazole1 (ABZ1), the 3rd with albendazole2 (ABZ2), and the 4th with tetramisole1 (TTM1), 5th with tetramisole2 (TTM2), 6th with ivermectin1 (IVM1) and 7th with ivermectin2 (IVM2). Faecal samples were collected on day 0 before treatment, and again on day 12 post-treatment. Efficacy for each anthelmintic was measured using the faecal egg count reduction test (FECRT). The study showed that ABZ2, TTM2, IVM1 and IVM2, with respective FECRT values of 100%, 99%, 97% and 99% possessed high activity against gastrointestinal nematodes of sheep of the study area. On the other hand ABZ1, with a 95% FECRT value and TTM1, also with a 95% FECRT value, had fewer efficacies against sheep nematodes. Coprocultures from both pre-and post-treatment demonstrated the predominance of *Haemonchus* spp. A questionnaire survey conducted to gather information on methods of sheep nematode control practices in the
study area revealed a lack of basic awareness amongst livestock owners about the best use and efficacy of anthelmintics. In addition, it indicated that farmers within the study area use many practices which may promote the development of anthelmintic resistance. Further detailed studies are necessary to clarify the present anthelmintic resistance status in Ethiopia.

**Key words:** Sheep, albendazole, tetramisole, ivermectin, anthelmintic efficacy, Hawassa.


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**Abstract:** The study was conducted with the objectives of determining the prevalence of major reproductive health problems of dairy cows and the possible risk factors in and around Kombolcha town from October 2011-April 2012. A total of 231 dairy cows were studied, out of which, 40.3 % (n=93) were affected by at least one clinical reproductive health problem. Mastitis, Abortion, Dystocia and Retained Fetal Membrane were found with prevalence of 19.3%, 9.05%, 7.75% and 7.32%, respectively. The prevalence of clinical reproductive problems showed significant difference (p<0.05) with respect to breed and parity of dairy cows where major reproductive health problems were observed more frequently in older cows and in cross breed dairy cows. Whereas, Age, management system and hygienic condition were not found to have significant influence (p>0.05) on the occurrence of reproductive problems in the area. This study revealed that the major clinical reproductive problems in and around Kombolcha town were prevalent. It is recommended, therefore, that hygienic condition, feeding, housing and health management should be improved to minimize the occurrence of these problems and associated economic losses in the dairy farms of the area.

**Key words:** Dairy Prevalence Management Reproduction health Kombolcha

*Dawit Tesfaye¹, Daryos Fekede¹, Worku Tigre², Alemayahu Regassa¹ and Amene Fekadu¹, 2013. Perception of the public on the common zoonotic diseases in Jimma, Southwestern Ethiopia, Inter. J. of Med. and Medical Sci. 5(6): 279-285

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**Abstract:** This study was conducted with the objective of assessing the perception of the public on common zoonotic diseases in Southwestern Ethiopia using a face-to-face interviewing technique. The respondents were stratified into four groups, namely: farmers (n=48), smallholder dairy farmers (n=44), butchers (n=34) and city residents (n=49). Many of them (97.1%) knew rabies was a zoonotic disease contracted via the bite and contact with saliva of a rabid dog. There was no statistically significant difference (P>0.05) in the level of awareness about rabies in the four respondents groups. Taeniasis was the second most recognised zoonotic disease (84.3%). Anthrax was known by 55.4% of respondents, whereas only 29.1% of them knew tuberculosis can be transmitted from cattle to humans. There was a significant (P<0.05) difference in the level of awareness with regard to zoonotic tuberculosis in the study groups where small holder dairy farmers had the highest awareness and traditional farmers had the lowest awareness. Majority of the respondents consume raw milk (66.8%), however, only 11.4% of them have knowledge about transmission of TB through raw milk and meat consumption. Awareness about echinococcosis was lower (4%) than other zoonotic diseases. The zoonotic importance of brucellosis was reported by none of the respondents. In general, the present study revealed a very low level of awareness by the public about major zoonotic diseases, signifying the need for public health promotion through education and inter-disciplinary one health approach with close collaboration among veterinarians, public health practitioners and policy makers.

**Key words:** Perception, public, transmission, zoonotic, disease, Ethiopia.

*Dawit Tesfaye¹, Diriba Daba¹, Birhanu Mekibib¹ and Amene Fekadu¹, 2012. The Problem of Environmental Pollution as Reflected in the Fore Stomach of Cattle: A Postmortem Study in Eastern Ethiopia, Global Journal of Environmental Research, 6(2): 61-65

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Abstract: The study was conducted on cattle at Hirna municipal abattoir from November 2011 to March 2012 in Hirna town. The objective of the study was to determine the prevalence and type of indigestible foreign bodies in rumen and reticulum of cattle slaughtered at the abattoir. From the total of 384 cattle examined, 92 (23.9%) were found positive for different types of foreign bodies in their rumen and/or reticulum. The foreign bodies recovered included: plastic 44 (11.5%), rope 18 (4.7%), piece of cloth 17 (4.4%), leather 15 (3.9%) and undigested feed 6 (1.6%). Prevalence of foreign body occurrence recorded in good and medium body conditioned animals was 22.8% and 37.9%, respectively; and the difference was not significantly different (P>0.05). The occurrence of foreign body was significantly higher (P<0.05) in rumen (18.2%) than reticulum (8.8%). In the present study, an overall prevalence of pathological lesion in the rumen and reticulum was 8.3%. The occurrence of lesions was observed to be associated with occurrence of foreign bodies where 90.3% of animals with lesion had foreign bodies but animal without lesion had a foreign body prevalence of only 21.3%. Occurrence of foreign body in the rumen and reticulum of cattle in the area was found to be widespread which calls for prompt action to assure proper waste disposal system.

Key words: Foreign body, Prevalence, Cattle, Rumen, Reticulum, Abattoir, Hirna


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Abstract: The study was undertaken to estimate the prevalence of ectoparasites in small ruminants of Bahir Dar area. A total of 395 small ruminants (280 sheep and 115 goats) were examined for the presence of different ectoparasites. From the 395 small ruminant examined, 193 were positive for one or more type of ectoparasite with an overall prevalence of 48.9%. Ectoparasites identified in sheep were: ticks (31.4%), fleas (13.2%), lice (3.8%), keds (1.8%) and mixed infections (4.6%) with total prevalence of 54.8%; whereas, in goat ectoparasites encountered were: tick (12.2%), fleas (11.3%), lice (9.7%) and mixed infections (1.7%) with total prevalence of 34.9%. From identified ticks, Rhipicephalus had the highest proportion followed by Amblyomma and Hyalomma. Ctenocephales felis was the most frequently observed flea species in both sheep and goats. However, low prevalence of Ctenocephales canis was also encountered. Lice genera observed were Bovicola and Linognathus. The former was seen in both host species; but, the later was observed only in goats. The Ked (Mellophagus ovinus) was observed only in sheep. The overall prevalence was significantly (p<0.05, OR=2.2) higher in sheep (54.8%) than goat (34.9%). Total ectoparasite prevalence was significantly (p<0.05) higher in young than adult small ruminants. Occurrence of ectoparasites infestation between the two sexes was not significantly different. Tick prevalence was markedly (p<0.05) higher in sheep than in goat; whereas, lice was significantly (p<0.05) higher in goats than sheep. This study demonstrates high infestation of ectoparasites in small ruminants signifying the need for control activities to be undertaken in the area to reduce their impact on the growth and productivity of small ruminants as well as on the leather industry.

Key words: Ectoparasite, sheep, goat, prevalence, Bahir Dar, Ethiopia.


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Abstract: The study was carried out to assess the economic burden of trypanosomosis in three villages of the Metekel zone in 2009. The disease was found to cause substantial economic losses through cattle mortality, drug purchase, and draft power loss of infected oxen. The farmers in the area were spending a significantly (p<0.05) higher amount of money for the treatment of trypanosomosis than all other diseases combined. The
overall mortality rate of cattle due to trypanosomosis was 4.4%. The mortality was significantly higher (p<0.05) in an area where trypanosomosis prevalence was also higher. Many of the farmers prioritized losses of draft power as the most important impact of the disease. The overall prevalence of the disease was 12.1%. The disease burden was significantly (p<0.05) higher in the rainy season than at other times of the year. In general, farmers had good knowledge on the signs and seasonality of trypanosomosis. Thus, tsetse suppression activities that involve the local community can be an important tool towards minimizing the economic burden of the disease in the area.

Key words: Economic burden, Trypanosomosis, Bovine, Metekel zone, Ethiopia


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Abstract: The study was conducted on small ruminants slaughtered at Jimma municipal abattoir from November 2010 to March 2011 in Jimma town. The objective of the study was to determine the prevalence and nature of foreign bodies in rumen and reticulum of small ruminants in the area. A total of 576 small ruminants were selected using simple random sampling method and 53 of them (9.2%) were found positive for foreign bodies in their rumen and/or reticulum. From each 288 sheep and goats examined, 28(9.7%) and 25(8.7%) were positive for various types of foreign bodies, respectively. There was no statistically significant (p>0.05) difference between the two species for the occurrence of fore stomach foreign bodies. Prevalence of foreign body recorded in <3 years, 3-4 years and >4 years old was observed to have no significant difference (p>0.05). Prevalence of foreign body recorded in thin, medium and fat small ruminants was 10%, 8.9% and 9.6%, respectively. However, the variation in the prevalence of foreign bodies among the body condition groups was also not significantly different (p > 0.05). From 53 animals positive for foreign bodies, rumen showed a significantly (p< 0.05, OR=4.04) higher occurrence (79.2%) than reticulum (20.8%). Increase in the rate of urbanization and lack of proper waste disposal system in the area seems to be major factors for the occurrence of foreign bodies in small ruminants. Therefore, strict regulation on proper waste disposal system need to be applied; whereas, veterinarians and animal health workers should consider foreign bodies as differential diagnosis for gastrointestinal abnormalities in the area.

Key words: Foreign body, prevalence, small ruminants, rumen, reticulum, abattoir, Jimma


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Abstract: A cross sectional study was conducted from November 2010 to March 2011 to estimate the prevalence of the major metacestodes of cattle slaughtered at Bahir Dar municipal abattoir. Out of 465 randomly selected slaughtered cattle, 12 (2.58%) and 148 (31.8%) were infected with *Cysticercus bovis* and Hydatid cyst, respectively. The prevalence of *Cysticercus bovis* was significantly different between castrated and uncastrated cattle. However, there was no significant difference for the prevalence of *Cysticercus bovis* among the different origins and management systems (p>0.05). There was also no marked difference in the prevalence of hydatid cyst in cattle among the different origins (p>0.05). In contrast, the difference in the prevalence of the hydatid cyst between the different management system was found to be statistically significant (p<0.05). Similarly, the prevalence of hydatid cyst was statistically significant between castrated and uncastrated cattle (p<0.05). Regarding organ distribution, tongue and masseter muscle were the most frequently infected organ with *Cysticercus bovis*. Whereas, lungs took the highest proportion among the other organs infected with hydatid cyst. The viability test of the metacestodes of cattle showed that 33.9 % of *Cysticercus bovis* and 20% of the examined hydatid cyst were viable. In a nut shell, the finding of the present study reflects a visible reduction in the prevalence of *Cysticercus bovis* from the previous years and still a higher prevalence in hydatid cyst. Therefore, serious attention should be given by various stake holders to break the life cycle of both metacestodes and hence reduce their impact on the public health.
**Key words:** *Cysticercus bovis* *T. saginata* Prevalence Wolaita soddo Abattoir Ethiopia


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**Abstract:** An Experiment was carried out to evaluate anthelmintic activities of three herbal plants, namely; *Dodonea viscose*, *Albizia gummifera* and *Veronia amygdalina* against gastrointestinal nematode infections in sheep. The experiment was set in a parallel group design (PGD) with five treatment groups each consisting four animals. The first group (G1) was treated with Albendazole (negative control) and the remaining three groups (G2, G3, and G4) received crude extracts of the candidate herbs. The fifth group (G5) was left untreated (positive control). Efficacy of the tested materials was measured based on the significances in the reduction in mean faecal egg count (MFECC) and improvements in mean body weight changes (MBWC) before and after treatments.

*Albizia gummifera* showed significant (p<0.005) anthelmintic activities with MFECC (%) of 52.2 ± 0.71, and MBWC (%) of 21.0 ± 1.1. Conversely, no significant (p>0.05) anthelmentic activities were observed with *Dodonea viscose* (MFECC (%) = 1.2±0.56 and MBWC = 10.2±1.96, P>0.05) and *Veronia amygdalina* (MFECC (%) = 5.7 ± 0.5 and MBWC (%) 4.2±10. *Albizia gummifera* was thus proved to bring maximum anthelmintic effects. However, further experiments need to be carried out to determine the optimal curative dose without any untoward toxicity effect on recipient subjects. In addition, it is recommended to evaluate the medicinal effects of the roots and barks of *Albizia gummifera* against various species of helminthes. This study also revealed that not all herbal plants traditionally used by farmers have anthelmintic effects. Future evaluation of medicinal values of indigenous herbs in Ethiopia is needed and conducted following standard procedures employing both in vitro and in vivo experiments.

**Key words:** Anthelmintic, Ethiopia, GI nematodes, Indigenous medicinal herbs, sheep.


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**Abstract:** Outbreak of coccidiosis associated with respiratory infection had occurred at a poultry farm of Awassa college of Agriculture in a period between March to May 2000, causing severe losses to the farm. Mortality and morbidity of the disease and its association with the respiratory infection was described. Of all the chicken population initially at risk (n=1382), 1200 (86.8%) were affected, of which 910 (75.8%) died. Significant degree of association (p<0.001) was reported between coccidiosis and the respiratory infection suggesting that the later had exacerbated severity of the former by possibly interfering with immunity and/or drug intake capacity of the chickens. The variations in morbidity and mortality due to coccidiosis between breeds were significantly high (p<0.001) and P<0.005, respectively. The Rhode Island Red and Fayoumi were more susceptible (99.4 and 100.0% morbidity rates, respectively) and were attacked severely (79.9 and 19.5% mortality rates, respectively) than Babcock (9.3% morbidity and mortality rates each). Fayoumi appeared to have developed a higher degree of post-infection resistance (case fatality rate 19.5%) than Rhode Island Red and Babcock in which the infection was more fatal (79.9%) and 100%, respectively. Age hand significantly (p<0.005) influenced the severity of coccidiosis. Young chickens had suffered at higher rate (69.9% and 74.3% morbidity and mortality rates respectively) than adults (30.1% and 25.7% morbidity and mortality rates, respectively). Coccidiosis was the major cause of loss to the farm and that concurrent occurrence of respiratory infection had exacerbated its severity. Treatment and immunization of chickens against any immune compromising infection like the respiratory disease could possibly help chickens resist severity of coccidiosis. Increasing resistance to coccidiosis is possible through adopting and maintaining genetically resistant breeds of chickens and their outbred lines.
Key words: Awassa, breed, coccidiosis, disease outbreak, poultry farm respiratory infection.

*Desie Sheferaw¹, Fikreysus Gebru¹, Metenyelesh Asrat¹, Dawit Tesfaye¹ and Etana Debela¹, 2014. Ingestion of indigestible foreign materials by free grazing ruminants in Amhara Region, Ethiopia, *Trop Anim Health Prod.*, 46(1): 247-250

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Abstract: Ruminants slaughtered in Bahir-Dar, northern Ethiopia, were studied to estimate the prevalence and types of foreign bodies in the rumen and reticulum. Of the 400 cattle, 320 sheep, and 320 goats examined between November 2011 and May 2012, 41.8, 20.6 and 11.9 %, respectively, contained one or more types of foreign bodies. The prevalence of foreign bodies was significantly (P <0.05) higher (i) in cattle than in sheep and goats, (ii) in cattle in poor body condition than those in good condition, and (iii) in the rumen than in the reticulum. The most commonly encountered materials were plastics, which resulted from the widespread use of plastic bags and improper waste disposal. Other materials found were cloth, rope, metal, and leather. The study demonstrated that ruminants in the area are ingesting various types of indigestible foreign bodies, which can hamper their health and productivity. To avert the problem, collaborative intervention schemes need to be applied involving professionals, policy makers, livestock keepers, and environmental activists.

Keywords: Foreign body ,Sheep ,Goats ,Cattle ,Rumen ,Reticulum ,Ethiopia

*Desie Sheferaw¹, Dejene Getachew¹, Jemere Bekele¹ and Yifat Denbarga¹, 2013. Assessment of anthelmintic resistance in gastrointestinal nematodes of small ruminants, Dale district, *Southern Ethiopia*, *Journal of Veterinary Medicine and Animal Health*, 5(9): 257-261

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Abstract: The anthelmintic resistance status of gastrointestinal nematodes of small ruminants owned by smallholder farmers in the Dale district, Southern Ethiopia, was investigated. A faecal egg count reduction test (FECRT) was conducted in traditionally managed and naturally infected goats and sheep. For this study, 60 sheep and 60 goats of both sexes, aged from 6 to 18 months, and with a faecal egg count (FEC) of more than 150 eggs/g of faeces were selected for the test from 5 neighboring kebeles. Both sheep and goats were grouped into four treatment groups: albendazole, tetramisole, ivermectin and control groups. In sheep, the percentage reduction in FECs (95% confidence intervals) for albendazole, tetramisole and ivermectin were 95.0% (86.5 to 98.2%), 97.5% (93.2 to 99.1%) and 96.7% (91.0 to 99.1%), respectively. In goats, the percentage reduction in FECs (95% confidence intervals) for albendazole, tetramisole and ivermectin were 96.6% (88.3 to 99.0%), 97.7% (90.6 to 99.4%) and 97.1% (91.0 to 99.1%), respectively. All the anthelmintics were found to be effective, but resistance to albendazole was suspected. Based on the findings, it was concluded that development of anthelmintic resistance could be prevented by avoiding frequent dosing and under dosing, while strategic deworming should be practiced by both animal health workers and animal owners.

Key words: Anthelmintics, resistance, faecal egg count reduction, small ruminants, Dale, Ethiopia.


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Abstract: The prevalence of equines helminthosis studied from November 2011 to May 2012 in two agroecological zones Damot-Gale district, Wolaita zone, Southern Ethiopia. The objective of the study was to estimate the prevalence, and to see the distribution of internal helminth parasites of equines. A total of 500 faecal samples collected for coprological examination of gastrointestinal helminth ova. From each species of studied animals 200 positive faecal samples were pooled and cultured, and then the larvae recovered and identified. The coprological examination revealed 100 % Strongyle, 16.6 % Fasciola species, 10.2 % Parascaris equorum, 2.1 % Oxyuris equi, 1.1 % Strongyloides westeri, and 0.7 % Gastrodiscus species in donkeys. The coproscopic examination of horse faeces revealed prevalence of 100 % Strongyle, 17.5 %
Fasciola species, 5.5% Parascaris equorum, 1.4% Oxyuris equi, 0.5% Strongyloides westeri. A statistically significant variations in the prevalence of equines helminthes were not observed among putative risk factors (P<0.05), except in the case of Parascaris equorum and Fasciola species, in which statistical significant variations were observed with age and purpose of the animal, respectively (P<0.05). The average egg per gram of faeces in this study was 689.8, with a range of 100–1,600 eggs per gram of faeces. Statistically significant variations in mean eggs per gram of faeces were observed in all the considered putative risk factors (P<0.05), except in the case of sexes. The coproculture performed on 200 pooled faecal samples revealed that Cyathostome species, Strongylius vulgaris, Trichostrongylus axei, Triodontophorus species, Strongylus equinus, Strongylus edentatus and Oesophagodontus robustus were the major helminth parasites of equines in Damot-Gale district, Wolaita.

**Keywords:** Equine, Prevalence, Internal helminth parasites, Wolaita, Southern Ethiopia

**Endale Mekuria**¹, **Shihun Shimelis**¹, **Jemere Bekele**² and *Desie Sheferaw*², 2013. Sheep and goats *Cysticercus tenuicollis* prevalence and associated risk factors, *African Journal of Agricultural Research*, 8(24): 3121-3125

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**Abstract:** The purpose of this study was to estimate the prevalence of *Cysticercus tenuicollis*, identify factors that can influence its occurrence and to assess the distribution of the cyst in the visceral organs of sheep and goats slaughtered at Dire Dawa municipal abattoir. A total of 845 animals (425 sheep and 420 goats) were examined at the abattoir. The overall prevalence of *C. tenuicollis* was 24.6% (95% CI = 21.7 - 27.5) and 22.8 and 26.4% in sheep and goats respectively. Body condition of sheep was the only risk factor in which the prevalence of *C. tenuicollis* significantly varied ($\chi^2 = 19.353, P < 0.05$). Sheep with poor body condition (39.8%) were found most infected compared to medium (21.8%) and good (14.5%) body condition. There was no significant variation in the prevalence of *C. tenuicollis* between sheep and goats, because species mainly dependent on grazing, and hence, had equal exposure and opportunity to get infected. The cyst was found most frequently attached to liver, omentum and peritoneum both in sheep and goats. In conclusion, the presence of *C. tenuicollis* at a higher prevalence and the consequent effect on small ruminant signify the need for the control of stray dog population, deworming of dogs, and avoidance of backyard slaughter and proper disposal of infected viscera to curtail the problem.

**Key words:** Prevalence, *Cysticercus tenuicollis*, sheep and goats, Dire-Dawa, Ethiopia.

**Ermias Marshet**¹, **Kassahun Asmare**¹, **Jemere Bekele**¹, **Tadesse Anteneh**¹, **Mesele Abera**, **Kassaye Aragaw**¹ and *Rahmeto Abebe*¹, 2011. The Status of Cystic Echinococcosis (Hydatidosis) in Small Ruminants Slaughtered at Addis Ababa Municipal Abattoir, *Journal of Animal and Veterinary Advances*, 10(11): 1445-1449

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**Abstract:** A cross-sectional study was carried out from November 2008-April 2009 in Addis Ababa abattoir to overview the status of hydatidosis in small ruminants in the country. A total of 611 sheep and 389 goats brought for slaughter from different parts of the country were involved. Out of 1000 small ruminants examined 97 (9.7%) were found to harbor hydatid cysts. Infection was significantly higher (p<0.05) in sheep (13.9%) than goats (3.1%). Likewise, significantly higher infection (p<0.05) was found in older age category (29.78%) than it was in younger (3.87%). However, sex did not demonstrate a difference of statistical significance (p>0.05). Out of 111 hydatid cysts recovered for laboratory observation, 52.25% were fertile while 28.83 and 18.92% were sterile and calcified, respectively. About 54% of the cysts from sheep were fertile while it was 33.33% for goats. Such an observation of a higher prevalence and fertile cysts in sheep compared to goats may suggest the enormous role that sheep could play in the occurrence of hydatidosis. In line with this finding, the need for proper disposal of offal, termination of backyard slaughter and control of stray dogs is recommended to prevent the economic loss and public health hazards associated with the disease.
Key words: Hydatidosis, Addis Ababa, abattoir, small ruminants, risk factors, Ethiopia

*Etana Debela¹, Buckhary Abdulahi¹, Bekele Megersa¹, Bersissa Kumsa², Fufa Abunna³, Desie Sheferaw¹ and Alemayehu Regassa¹, 2014. Hydatidosis of camel (Camelus dromedarius) at Jijiga municipal abattoir, Eastern Ethiopia: prevalence, associated risk factors and financial implication, J. Parasit Dis., 10.1007/s12639-014-0430-x (Available online)

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Abstract: A cross-sectional study was conducted from November 2010 to May 2011 to estimate the prevalence of camel hydatidosis, associated risk factors and financial loss in Jijiga municipal abattoir, Somali Regional State, Eastern Ethiopia. Accordingly, of the total 400 inspected camel, 92 (23 %) camels and 109 organs were positive for hydatid cyst with the highest proportion recorded in lung (56 %) followed by liver (33.9 %), spleen (7.3 %) and kidneys (2.8 %). The prevalence of hydatidosis significantly varied among age categories (P<0.05), sex (P<0.05) and body condition score (P<0.05) of camels. Hence, there is higher likelihood for occurrence of camel hydatidosis among the older age groups (OR 1.8, 95 % CI 1.2, 3.3), in female camels (OR 2.8, 95 % CI 1.7, 4.7) and in poor body conditioned camels (OR 4.1, 95 % CI 2.2, 7.9) than younger camels, males and camels with good body condition score, respectively. Of the total 288 examined cysts for fertility and viability, 59.7 % (172/288) were fertile while the rest 24.0 % (69/288) cysts were sterile. Of the 172 fertile cysts 69.8 % (n = 120) were viable and 30.2 % (n = 52) were non-viable. The rest 16.3 %(47/288) cysts were found dead. It was also observed that the pulmonary and hepatic cysts had fertility rate of 63.7 % (116/182) and 57.4 % (54/94), respectively. The total annual direct financial loss recorded in this study as result of organs condemnation due to hydatid cyst, was 12,147.75 Ethiopian birrs ($714.57 or $7.77/ camel). If this value could be extrapolated to the infected camel population of the region, financial loss due to hydatidosis could be enormous. In conclusion, this study showed the importance of hydatidosis and the associated direct financial loss due to the condemnation of organs affected by hydatid cyst in the study area.

Key words: Camelus dromedarius, Hydatidosis, Prevalence, Cyst viability, Financial loss

*Etana Debela¹ and Adugna Tolera², 2013. Nutritive value of botanical fractions of Moringa oleifera and Moringa stenopetala grown in the mid-Rift Valley of southern Ethiopia, Agroforest Syst, 87(5): 1147-1155

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Abstract: Nutritive value of botanical fractions (leaves, twigs, pods and whole forage) of Moringa oleifera and Moringa stenopetala were evaluated based on chemical composition, in sacco dry matter (DM) degradability, in vitro gas production and in vitro organic matter digestibility. The objective was to characterize the nutritive value of the different morphological fractions in order to determine their potential as alternative sources of livestock feed. The crude protein content (g/kg DM) was highest (P<0.05) in M. oleifera leaves (361.2) followed by M. stenopetala leaves (334.4) and lowest in M. oleifera twigs (79.1) and M. stenopetala pods (89.2). The fiber (NDF, ADF and ADL) contents were higher (P<0.05) in the twigs and pods than the leaves and whole forage in both species. The different morphological fractions of both species had high mineral content, although the Na content was low or marginal in most fractions except whole forage and green pods of M. stenopetala. The in sacco DM degradability ranked the morphological fractions in the order of leaves whole forage = pods twigs after 24 h of incubation time. The potential degradability (A ? B) was highest (P<0.05) in M. oleifera twigs (97.9 %) and M. stenopetala leaves (98.5 %) and lowest in the pods of both species (64.4–69.5 %) with intermediate values in all other fractions. No significant differences were observed in the instantly fermentable fraction (a) and rate of gas production (c), whereas lower (P<0.05) insoluble but slowly fermentable (b) and potential gas production (a ? b) were recorded in the pods than in the other morphological fractions of both species. The study showed that the different morphological fractions of the two Moringa species are good source of nutrients with high degradability which could be used as potential supplements to low quality tropical roughages.

Key words: Moringa oleifera, Moringa stenopetala, Degradability, Gas production, In vitro organic matter digestibility
Academic Success Depends on Research and Publications

Etana Debela1,2, Adugna Tolora3, Lars Olav Eik1 and Ragnar Salte1, 2012. Condensed tannins from Sesbania sesban and Desmodium intortum as a means of Haemonchus contortus control in goats, Trop Anim Health Prod., 44(8): 1939-1944

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Abstract: Two experiments were conducted to determine whether the proanthocyanidin (condensed tannin)-containing forage legumes Desmodium intortum cv Greenleaf and Sesbania sesban (accession 15019) could be integrated into a feeding management strategy as a means of Haemonchus contortus control in goats. The anthelmintic effects of condensed tannin extracts from the two legumes on H. contortus L3 larvae were studied in an in vitro larval migration inhibition system. The extracts inhibited larval migration in a dosedependent manner, and at concentrations from 1,000 µg/ml condensed tannin, the extract from D. intortum caused a significantly higher inhibition of larval migration than did the corresponding concentrations of the S. sesban extract (P<0.01). Prolonged feeding of tanniniferous forage legumes showed that animals receiving D. intortum had the lowest total worm burden, the lowest female to male parasite ratio, the lowest number of eggs in the uterus of each female worm and the lowest per capita fecundity (P<0.01). However, there was no change in the performance (weight gain) of parasiteinfected goats probably due to incomplete removal of the parasite or prolonged confinement of goats in small pens, which calls for further investigation. However, since there is no single efficient method in control of parasites, based on the obtained data from this experiment, integrated feeding of D.intortum with other suitable method of parasite control is thus suggested.

Key words: Condensed tannins . Gastrointestinal nematode . Haemonchus contortus . Goats

*Etana Debela1,2, Adugna Tolera3, Lars O. Eik1 and Ragnar Salte1, 2011. Nutritive value of morphological fractions of Sesbania sesban and Desmodium intortum. Tropical and Subtropical Agroecosystems, 14: 793-805

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Summary: Nutritive value of morphological fractions of Sesbania sesban [accession 15019] and Desmodium intortum cv. Greenleaf was estimated based on chemical composition, in sacco dry matter (DM) degradability, in vitro gas production (IVGP) and in vitro organic matter digestibility (IVOMD). In Sesbania, neutral detergent fiber (NDFom) and acid detergent fiber (ADFom) contents were higher (P<0.05) in twigs and green pods, whereas the acid detergent lignin (ADLsa) content showed the following ranking order (P<0.05): green pods > twigs > whole forage > leaves. The soluble tannins (STs) content was higher (P<0.05) in green pods and whereas the content of condensed tannins (CTs) was higher (P<0.05) in leaves and whole forage. All fractions had sufficient levels of macro and micro minerals, except sodium. Sesbania leaves and whole forage had higher (P<0.05) potential in sacco degradability (A+B) and in vitro organic matter digestibility (IVOMD). In the case of Desmodium, the twigs had lower CP contents and leaves had lower NDFom, ADFom and ADLsa contents. The STs content was highest in leaves whereas the CTs content was higher in whole forage. The washing loss (A) was higher in twigs, while the slowly degradable fraction (B) was higher in green pods. In the view of the nutrient contents, both Sesbania and Desmodium can be used as a supplement to improve the nutritional status of ruminants fed low quality roughages.

Key words: Chemical composition; in sacco DM degradability; in vitro gas production; minerals; tannins.


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Abstract: A longitudinal study was carried out to determine the prevalence and incidence of mastitis in lactating dairy cows from November 10, 2011 to June 25, 2012 in six purposively selected smallholder dairy farms in Hawassa and Wendo-Genet districts, Ethiopia. The study was carried out through field screening surveys by California mastitis test for each quarter milk sample, followed by retesting negatives group for mastitis twice a month during the study period to estimate the incidence of mastitis. At the time bacteriological examinations to identify the causative agents from mastitis positive cows were carried out. A total of 122 milking cows were examined, out of which 77 (63.1%) and 152 (31.1%) were found positive for mastitis on the basis of California mastitis test at cow and quarter level, respectively. Out of the total quarters examined, 25 (5.12%) were recorded as a blind teats. The incidences of mastitis were seen to be 0.49 in three month study period. Slight variations in incidence rate between different farms were revealed. Higher incidence rate of 0.54 was recorded in cows kept in bad concrete in comparison to cows kept in good concrete which is 0.41. On the other hand, higher incidence rate was recorded in single and three or above parity; in early and late stage of lactation.

Key words: Movine mastitis, prevalence, incidence, Hawassa, Wendo-genet, major pathogens.


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Abstract: A cross-sectional study was conducted on lactating dairy cows to determine the prevalence, risk factors and bacterial causative agents in smallholder dairy farms from October, 2008 to March, 2009. The result of this study revealed that the overall prevalence of mastitis was found to be 52.27% (15.41% clinical and 36.86% sub-clinical cases). Among the total (1324) quarters examined, 61 (4.61%) had blind teats. The prevalence of mastitis showed statistically significant difference between, number of parity, stage of lactation, body condition of animals, farm hygiene and udder washing (P<0.05). However, there was no statistically significant difference noted among the risk factors, herd size, age of the animals, previous mastitis and use of contaminated towel(P>0.05). From CMT positive (146) samples sent to a laboratory for microbiological examination, 71 bacterial isolates were identified. The majority of isolates were Staphylococcus aureus (S.aureus) (21.13%) followed by Streptococcus agalactiae (S.agalactiae) (18.31%) and Coagulase negative staphylococci (CNS) (11.27%) and the lowest isolation rate was for Micrococcus species (2.82%). The Other species which isolated include Actinomyces pyogenes (A.pyogenes), Klebsiella species and Streptococcus iber(S.iberis) (4.23% each), Streptococcus dysgalactiae(S. dysgalactiae) (5.63%), Corynebacterium bovis(C.bovis) and Escherichia coli(E.coli) (7.04% each), Streptococcus pyogens(S.pyogens) (8.45%) and Bacillus species (5.63%). This study demonstrated that both clinical and sub clinical mastitis is common in smallholder dairying in Addis Ababa city and that some of the risk and protective factors for mastitis can be addressed by practical management of dairy cows.

Key words: Epidemiology, Species, Husbandry, CMT, Addis Ababa, Ethiopia

*Fufa Abunna¹, Berhanu Mekibib², Mulugeta Kidanemariam¹, Kebede Amenu³ and Desta Beyene⁴, 2012. Management assessment of cattle exposed to trypanosomosis challenge in the new settlement and native areas of the Ghibe Valley, Southwestern Ethiopia, Revue d’élevage et de médecine vétérinaire des pays tropicaux, 65(1-2): 11-15

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Abstract: A study was conducted from October 2007 to April 2008 using a semi-structured questionnaire and blood samples in the Ghibe Valley, southwest of Ethiopia, to assess the management of cattle exposed to...
trypanosomosis in two communities, the natives and the new settlers. Blood samples collected from the ear of 429 cattle (210 from the natives and 219 from the new settlers) revealed an overall prevalence of 5.4%, with 6.2 and 4.6% in the natives and the new settlers, respectively. This difference between communities was not significant (p > 0.45). Qualitative and quantitative information was obtained from 50 natives and 51 new settlers randomly selected using the questionnaire. Most management practices of cattle in the natives’ and new settlers’ communities were found to be significantly different. Although the prevalence of trypanosomosis infection was not significantly different between the two communities, more animals were found anemic in the natives’ herds than in the new-settlers’. Further research should be carried out to determine the major reason that contributed to the difference observed between the PCVs of both communities. Moreover, attention toward effective management of trypanosomosis in both communities of the Ghibe Valley is needed to improve prevention and control strategies.

Key words: Cattle, Trypanosoma, Trypanosomosis, Livestock management, Ghibe Valley, Ethiopia.


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Abstract: A survey was conducted to identify tick species and determine the prevalence of tick infestation in small ruminants of Bedelle District, West Oromia Region. Collection and identification of the ticks were undertaken from November 2010 to March 2011. All visible individual adult ticks were collected from the body of 121 goats and 330 sheep. The prevalence of tick infestation in goats and sheep was found to be 66.12% and 80.7%, respectively. In this study, six species of ticks which grouped under three genera were identified. The most abundant species found in this study were Amblyomma coherence (35.25%), Amblyomma gemma (17.07%) and Amblyomma lepidum (18.48%), Amblyomma variegatum (15.96%), Rhipicephalus evertsi evertsi (2.44%) and Boophilus decoloratus (0.89%) Boophilus decoloratus is the minor species of tick observed on sheep and none these ticks were recorded in goats in the study area. The difference in the prevalence of tick infestation between sheep and goats was statistically significant ($\chi^2=9.43$, $p=0.002$) but found to be statistically significant between male and females ($\chi^2=2.83$, $p=0.071$). Attention should be given to the control and prevention of ticks, since they cause severe damage to the skins of small ruminants and thereby reduce the foreign exchange of the country; they also transmit some diseases which can cause severe loss to the productivity of these animals.

Key words: Small Ruminants, Survey, Tick, Bedelle, Ethiopia


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Abstract: A study to determine the prevalence of bovine hydatidosis was conducted in Kombolcha ELFORA abattoir. A total of 400 cattle randomly sampled and examined after slaughter for the presence of hydatid cysts in the organs and viscera of the animals using the standard meat inspection procedures. Positive or suspected samples were taken to the parasitology laboratory at the Kombolcha regional laboratory and cyst identification, fertility and viability tests were performed. The statistical analysis showed that there was no difference ($P > 0.05$) between the prevalence of bovine hydatidosis and sex of animals, $P > 0.05$. The prevalence of hydatidosis was also found to be significant with the age and origin of the study animals ($P < 0.05$). Of 191 cysts examined, 154(80.63%) calcified, 1(0.51%) sterile, and 36(18.85%) fertile cysts. From the total fertile cysts, 24(72.22%) were found to be viable. Of 108 cysts recorded in the lung, 74(68.52%) calcified, 1(0.93%) sterile, 21(19.44%) viable and 12(11.11%) were non viable. Further, of 70 cysts recorded in the liver, 67 (95.71%) were found to be calcified and 3(4.29%) viable. A total of 16,068 cattle were slaughtered from 2003 to August 2007 and the overall 1955 (12.17%) prevalence of hydatidosis was recorded. The results of this study showed that hydatidosis pose significant economic problems by causing condemnation of considerable numbers organs, rendering them unfit for market. Therefore, initiation and
implementation of control measures is necessary in order to alleviate its economic impact as well as zoonotic risks to the human.

**Key words:** Abattoir, Hydatidosis, Cattle, Prevalence, Kombolcha, Ethiopia

*Fufa Abunna¹, Dasta Ayala¹, Alemayehu Regassa¹, Bekele Megersa¹ and Etana Debela¹, 2011. Major Metacestodes in Cattle Slaughtered at Nekemte Municipal Abattoir, Western Ethiopia: Prevalence, Cyst Viability, Organ Distribution and Socioeconomic Implications, *BIOMIRROR, an Open Access Journal*, 2(10): 1-7

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**Abstract:** A cross sectional study to determine the prevalence and socioeconomic importance of major metacestodes of cattle was conducted from November 2010 to March 2011 at Nekemte municipality abattoir. Accordingly, of 436 randomly selected slaughtered cattle, the prevalence of C.bovis and hydatid cyst was found to be 2.98% (13/436) and 23.17% (101/436), respectively. The logistic regression for the prevalence of cysticercosis indicated that there was statistically significant difference (p< 0.05) observed between body condition scores. The statistical analysis for the prevalence of hydatid cysts also indicated that there was no statistically significant difference (p> 0.05) observed between the age groups and body condition scores for the prevalence of hydatidosis (p= 0.377) and (p= 0.070). Of the total 27 C. bovis cysts and 236 hydatid cysts collected, 17 (47.09) and 12(5.57) were found to be alive, respectively indicating the higher proportion of viable C. bovis cyst than hydatid cyst. Out of the total 72 interviewed volunteer respondents of Nekemte town, 9.72 % (7/72) had contracted T. saginata. The logistic regression analysis of the risk factors showed that there was no statistically significant difference (p>0.05) observed among the important risk factors for the prevalence of Taeniasis, age (p= 0.248), occupation (p= 0.211), literacy (p= 0.211) and marital status (p= 0.610). The economic impact of Taeniasis from the estimates of yearly adult taenicidal drugs dose and its worth was 198, 676 adult taenicidal drug doses and a total worth of 523,112 Eth. Birr. This study revealed the relatively high dose of Alebendazole, Niclosamide, Mebendazole and Praziquantel, respectively. In conclusion, the findings of the present study revealed that the zoonotic and socioeconomic importance of the diseases needs intervention.

**Key words:** Abattoir, Metacestodes, Prevalence, Cattle, Questionnaire, Ethiopia.

*Fufa Abunna¹, Loma Asfaw¹, Bekele Megersa¹ and Alemayehu Regassa¹, 2010. Bovine fasciolosis: coprological, abattoir survey and its economic impact due to liver condemnation at Soddo municipal abattoir, Southern Ethiopia, *Trop Anim Health Prod, 42(2): 289-292

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**Abstract:** A study was carried out to determine the prevalence and the species of liver flukes in indigenous adult cattle, to compare the diagnostic efficiency of fecal and post mortem examination and to assess the economic significance of bovine fasciolosis due to liver condemnation in the abattoir. Of the 406 live rs and fecal samples examined, 57 (14.0%) and 20 (4.9%) were positive for fasciolosis. The most common liver fluke species affecting the cattle was *Fasciola gigantica*, 9.1% of cattle were infected with *F. gigantica* while, *F. hepatica*, mixed infections and unidentified or immature forms of Fasciola spp. were present in 3.2 %, 0.7% and 1 % of cattle, respectively. A retrospective abattoir survey revealed that the prevalence of fasciolosis was 12.7%. The prevalence of fasciolosis recorded in this study was lower than that reported by other researchers in this country. There was a strong relationship between fecal examination and postmortem findings of liver lesions, (K=0.23) but under local conditions, postmortem examination was considered a better diagnostic tool for fasciolosis. Fasciolosis is of significant economic importance as the resultant liver condemnations caused an average loss of 4000 USD perannum. Hence, this disease deserves serious attention by the various stakeholders in order to promote the beef industry in the study area in particular and in the country in general.

**Key words:** Abattoir, Bovine, Coprology, Ethiopia, Fasciolosis, Soddo
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*Fufa Abunna¹, Diriba Kasasa¹, Berhanu Shelema¹, Bekele Megersa¹, Alemayehu Regassa¹ and Kebede Amenu², 2009. Survey of tick infestation in small ruminants of Miesso district, West Harergie, Oromia Region, Ethiopia, Trop Anim Health Prod., 41(6): 969-972

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Abstract: A survey was conducted to identify tick species and determine the prevalence of tick infestation in small ruminants of Miesso District, West Harergie Zone. Collection and identification of the ticks were undertaken from November 2007 to April 2008. All visible individual adult ticks were collected from the body of 328 goats and 40 sheep. The prevalence of tick infestation in goats and sheep was found to be 89.9% and 87.5%, respectively. In this study, ten species of ticks which grouped under four genera were identified. The most abundant species found in this study were Boophilus decoloratus (60%), Rhipicephalus pulchellus (25.1%), and Amblyomma gemma (11%). Hyalomma dromedarii was the minor species observed on goats. The difference in the prevalence of tick infestation between sheep and goats was not statistically significant (Χ²=0.22, p=0.63) but found to be statistically significant between male and females (Χ²=9.8, p= 0.003). Attention should be given to the control and prevention of ticks, since they cause severe damage to the skins of small ruminants and thereby reduce the foreign exchange of the country; they also transmit some diseases which can cause sever loss to the productivity of these animals.

Key words: Ethiopia, Small ruminants, Survey, Tick, Miesso


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Abstract: A cross-sectional study was conducted from October 2005 to April 2006 on bovine cysticercosis in cattle slaughtered at Awassa municipal abattoir with the objective of determining the prevalence of Taenia saginata cysticercosis, cyst viability, distribution and its public health implication. Questionnaire survey involving 120 respondents was also conducted on human taeniasis. A total of 400 carcasses were examined during the study period, of which 105 (26.25%) were infected with T. saginata metacestodes. From a total of 3200 samples inspected, 500 cysticerci were detected in 141 samples, of which 221 (44.2%) were alive. The anatomical distribution of cysticerci were 65 (29.2%) heart, 56 (25.3%) shoulder muscle, 59 (26.7%) masseter, 23 (10.4%) tongue, 12 (5.4%) diaphragm, three (1.4%) liver, two (0.9%) lung and one (0.5%) kidney samples. The prevalence varied significantly between local and crossbred animals (OR = 3.15, P < 0.05), but not varied between sex, age groups and origin of the animals. T. saginata taeniasis was a widespread public health problem in the town with an overall prevalence of 64.2% (77 of 120). The potential risk factors for disease contraction were raw meat consumption, religion and occupational risks. In conclusion, the study revealed high prevalence of T. saginata metacestodes throughout the edible organs together with existence of deep rooted tradition of raw meat consumption. This may magnify the public health hazards of T. saginata in the study area. As a result, the disease deserves due attention to safeguard the public health and further promote beef industry in the country.

Key words: abattoir survey; Taenia saginata; bovine cysticercosis; cattle; prevalence; public health; Ethiopia


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Abstract

Objective: The study was conducted between October 2005 and April 2006 in Awassa town and its surroundings to investigate the status of T. saginata taeniasis, its socio-economic importance and potential risk factors.
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Methods: Questionnaire survey was conducted on 120 volunteer individuals selected at random. Additionally, retrospective study on taenicidal drugs inventories at 12 pharmaceutical shops was conducted.

Results: *T. saginata* taeniasis was a widespread problem in the town and its surroundings with overall prevalence of 64.2% (77 out of 120) and maximum infection frequencies of five times per year. The prevalence of taeniasis was significantly varied between religion, occupation, raw meat consumption and use of spices with raw meat. Accordingly, Christian communities (OR = 5.2, 95% CI=1.20- 22.50), high-risk groups (OR = 4.05, 95% CI=1.27-12.93), raw meat consumers (OR = 7.9, 95% CI=2.46 - 5.66), and spices users (OR = 11.6, 95% CI=2.85- 47.28) had higher likelihood of acquiring taeniasis than Muslim communities, low risk groups, cooked meat eaters and non-spices users, respectively. Conversely, prevalence was not varied between sex, age, marital status and educational backgrounds of the respondents. Respondents’ preferences to available taenicidal drugs had strong linear relationship with drug dose sold ($R^2 = 0.92$), and showed that Niclosamide (46.8%) was the drug of first choice while Praziquantel (13%) was the least preferred drug. The taeniasis drug doses and treatment cost from 2002 to 2005 were estimated to be 4,913,346 adult doses and 820,343 USD (7,219,021 Eth. Birr as per rate of 2006).

Conclusion: Taeniasis was a widespread problem with higher prevalence and frequent infections in the town and its surroundings. Socio-cultural conditions and occupation were the major risk factors for the occurrence of the disease. Hence, owing to its public health and economic importance, taeniasis deserves serious attention in order to safeguard the public health.

Key words: Prevalence, Questionnaire, Risk factors, Taeniasis, *T. saginata*, Awassa, Ethiopia

*Gelagay Ayelet*¹, Samuel Derso², Shiferaw Jenberie¹, Worku Tigre³, Negatu Akilulu³, Esayas Gelaye¹ and Kassahun Asmare,²⁴ 2013. Outbreak investigation and molecular characterization of African horse sickness virus circulating in selected areas of Ethiopia, *Acta Tropica*, 127: 91-96

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Abstract: The study was conducted from June 2011 to May 2012 in central, northern and western parts of Ethiopia to investigate and identify circulating serotypes of African horse sickness virus (AHSV). The indigenous knowledge of equine owners about AHS in the study areas was assessed and also the retrospective data of AHS outbreaks for 2011 were analyzed. Whole blood samples were collected for virus isolation and serotyping from diseased horses and mules showing typical signs of the AHS. Virus isolation on Vero cell and detection of AHSV genomes using conventional RT-PCR were conducted. Further molecular characterization and serotyping were done on positive isolates. The questionnaire survey revealed that equine owners do recognize AHS clinically and have a local name that varies in different regions. From the 72equine owners interviewed about their knowhow of AHS, 48 (66.7%) of respondents were not aware of AHS disease mode of transmission. The retrospective disease report data showed that a total of 208 outbreaks were reported and 3036 cases and 1167 deaths were recorded in 2011. AHS outbreaks were more frequently observed from September to December and the highest number of outbreaks was recorded in October. During the study period totally six outbreaks were investigated and a total of 62 horses and 10mules were found sick and all the four forms of AHS were observed. Cardiac form accounted for 52.8%, followed by African horse sickness fever form 31.9%, pulmonary form 8.4% and mixed form 6.9%. AHSV-9 was the only serotype circulating in the outbreak areas.

Key words: African horse sickness, Equine, Ethiopia, Risk factors, Virus serotype.

*Gelagay Ayelet¹, Shiferaw Jenberie¹, Alebachew Belay¹, Awol Mohammed², Bereket Mola², Yonas Gizaw³, Yibeltal Muhie³, Esayas Gelaye¹, Kassahun Asmare ³⁴ and Eystein Skjerve⁴, 2013. The first isolation and molecular characterization of camel pox virus in Ethiopia, *Antiviral Research*, 98(3): 417-422
Abstract: A cross-sectional study was conducted from November 2011 to April 2012 in Chifra district of Afar and in Jigjiga Zone of Somali Regional States of Ethiopia with the aims of assessing the epidemiology of camelpox and isolate and molecularly characterize the virus. The study included a questionnaire, active disease search and virus isolation and sequencing. A total of 24 (4.50%) and 12 (3.0%) camels in Afar and Jigjiga respectively were found clinically sick of camelpox during the study period. The questionnaire survey indicated that camelpox is the most common disease in the areas in which 125 (96%) of the respondents reported the frequent occurrence of camelpox in their herds especially during rainy season. The PCR result revealed 12 out of 17 tested samples were positive, of which seven of them collected from Jigjiga zone showed the characteristic PCR positive bands of 881 bp size fragments while five of the Afar samples gave two faint bands. Ethiopian isolates, specially isolated from Somali have very high identity with comparable sequences of CMLV M-96 from Kazakhstan and CMLV CMS from Iran. Out of the total of 780 bp analogous sequences, Ethiopian isolates differ only in two positions, while CMLV-Teheran differed at four nucleotide positions. The successful isolation and molecular characterization of camel pox virus in Ethiopia could help for early diagnosis and control of the disease in the country.

Key words: Camel pox, Epidemiology, Virus isolation, Sequencing, Ethiopia

*Gelagay Ayelet1,4, Soressa M2, Tesfaye Sisay2, Belay A1, Esayas Gelaye1, Shiferaw Jembere1, Eystein Skjerve3 and Kassahu Asmare3,4, 2013. FMD virus isolates: The candidate strains for polyvalent vaccine development in Ethiopia, Acta Tropica, 126(3): 244-248

Abstract: The study was conducted on foot-and-mouth disease (FMD) viruses with the aim of selecting appropriate vaccinal strain to control of FMD in Ethiopia. The study was conducted in two-dimensional virus neutralization assay to determine the antigenic relationship ‘r’ value between the candidate vaccine strains and field isolates. A total of 21 serotype O, 7 serotype A, and 8 serotype SAT 2 FMD viruses, which were isolated from cattle and swine. A couple of isolates from each serotype were identified as vaccine candidates in the trial (O-ETH/38/2005, O-ETH/58/2008, A-ETH/7/2008, A-ETH/6/2000, SAT2-ETH/76/2009 and SAT2-ETH/64/2009). The finding revealed all the vaccine candidate depicted high antigenic similarity, above the mean “r” value, to their own serotypes in the studied serotype population except for one serotype A field isolate, A-ETH/13/1981, with “r” value = 0.14 and 0.25) which is significantly lower than the minimum requirement. In general, the result indicated that these candidate vaccinal strains can be used for polyvalent vaccine production in the country.

Key words: FMD virus, Field isolates, Vaccine strains, Vaccine matching, ‘r’ value, Ethiopia


Summary: This study was designed to describe the status of foot and mouth disease (FMD) in Ethiopia, through analysis of FMD outbreak reports and the detection of antibodies, to address the possibility of establishing a disease-free zone. Serum samples collected from cattle between 2003 and 2006 for the sero-surveillance of rinderpest were used for this study. The records of the Ministry of Agriculture and Rural Development from 2002 to 2006 indicate that FMD outbreaks occurred each year in Ethiopia during this
period, with the highest number in 2004, when 134 outbreaks took place. The highest rates were from the North Shoa zones of both the Oromia and Amhara regions. The serum samples were tested using the 3ABC enzyme-linked immunosorbent assay kit, to identify antibodies against FMD. From a total of 4,465 sera, 10.5% (n = 467) tested positive. The highest seroprevalence was detected in samples from the Eastern zone of Tigray with 41.5%; followed by the Guji zone of Oromia and Yeka district of the city of Addis Ababa, with 32.7% and 30%, respectively. Antibodies specific to FMD virus were not detected in Gambella or Benishangul. The effects of cattle, sheep and goat density, both separately and together, were analysed with a spatial regression model, but did not have a significant effect on seroprevalence. This indicates that other factors, such as farming systems and livestock movement, play a significant role in the occurrence of FMD. Based on these study findings, it might be appropriate to establish disease-free zones in Gambella and Benishangul.

Key words: Cattle, Disease-free zone, Epidemiology, Ethiopia, Foot and mouth disease


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Abstract: A study was conducted on 393 apparently healthy exotic and local chickens reared at different management systems in eastern Ethiopia in order to determine the sero-prevalence of Salmonella Gallinarum and Salmonella Pullorum. To achieve this objective, blood samples were collected and the expressed sera were used from the selected chickens for antibody detection. The samples were from Haramaya University (309 chickens) and Dire Dawa (84 chickens). Subsequently, serum slide agglutination test was employed. Based on this, the overall prevalence of Salmonella Gallinarum and Salmonella Pullorum was 125/393 (31.8%). The prevalence of each farm was 95 (30.7%) Haramaya University farm, 13 (32.5%) Dire Dawa University farm and 17 (38.6%) local breeds of Dire Dawa. Moreover, the study has recorded higher prevalence in back yard chickens as compared to chickens reared at intensive farms. However, associated risk factors have not been found statistically significant at (P value < 0.05). In conclusion, the present study revealed Salmonella Gallinarum and Salmonella Pullorum were prevalent in both production systems. Therefore, further epidemiological investigations on these pathogens and implementation of control measures are mandatory.

Key words: Sero-prevalence, Serum slide agglutination, Salmonella Gallinarum, Salmonella Pullorum, Chickens


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Abstract: A longitudinal study was undertaken from December 2009 to February 2010 at Hawassa town, Ethiopia, in smallholder dairy farms to identify the role of Staphylococcus aureus and Streptococcus agalactiae in causation of subclinical mastitis and also to assess the role of selected risk factors in the transmission of these pathogens. A total of seven farms were selected. The farms were first screened for subclinical mastitis by California Mastitis Test (CMT) and those free of the disease were monitored. Each farm was visited at intervals of two weeks and during each visit CMT was conducted. A milk sample was aseptically collected from quarters that were CMT positive (a CMT score of greater than or equal to one). Milk samples were cultured, and S. aureus and S. agalactiae were isolated. A cow found positive in CMT in the first test and had S. aureus and S. agalactiae was then excluded and was not subsequently tested and
sampled. The average subclinical mastitis incidence rate due to *S. aureus* and *S. agalactiae* was found to be 21.84 ± 0.06 Sd per 100 cow-months at risk. Out of 165 CMT positive milk samples cultured for isolation of *S. aureus* and *S. agalactiae*, 88 (53.32%) yielded *S. aureus* and 30 (18.17%) had *S. agalactiae*. Co-infection by *S. aureus* and *S. agalactiae* was found in 14 (8.48%) of CMT positive milk samples. Generally, 104 CMT positive milk samples (63.03%) were due to *S. aureus* and *S. agalactiae*. Out of the 12 questions to the milking practice and other contagious mastitis control measures, only two were practiced by all farms: milking mastitic cows last and treating all cases of clinical mastitis. This study reveals that *S. aureus* and *S. agalactiae* were the major causes of subclinical mastitis and mastitis control strategies in those farms, and possibly other local dairies which have to focus on these pathogens.

**Key words:** Contagious mastitis, Hawassa, Subclinical mastitis, *Staphylococcus aureus*, *Streptococcus agalactiae*.


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**Abstract:** A cross-sectional study was conducted from January to June 1999 on bovine tuberculosis (BTB) in cattle and its public health implications to cattle raising families in wolaita soddo, Southern region of Ethiopia. A total of representative 416 cattle above the age of 6 months (139 zebu, 69 exotic and 208 crossbred) and 110 heads of households who owned cattle were randomly sampled. The investigation consisted of the comparative intra dermal tuberculin test involving the use of bovine (B) and avian (A) purified protein derivatives (PPD’s) and questionnaire survey. The result indicated that the overall prevalence of BTB in cattle was 14.2%. the highest being in the exotic breed (24.6%) and the lowest I zebu (8.6%), and the moderate was in the crosses (14.4%). In both univariate and multivariate analyses the exotic breed was about four times at risk as compared to the zebu breed (Odds Ratio, OR) = 3.95;95% confidence interval (CI) = 1.54,7.75). the reactivity to tuberculin test varied significantly (P< 0.05) among the different age groups; cattle of ages between 3-6 years were about eleven times at risk relative to those below one year of age (OR= 10.89;95% CI =1.36,87.01). Multivariate analysis of management with other risk factors indicated that cattle kept under poor management were over seven times at higher risk that those kept under poor management were over seven times at higher risk than those kept under good management (OR = 7.63; 95% CI = 2.26, 25.79). Of the total 110 households, 23 (21%) had tuberculosis (TB) case/cases in their family; again, out of these, 11 (48%) had reactor cattle. The association between human TB patients among cattle owners and reactor cattle was statistically significant (p< 0.01). In conclusion, the results of the present study showed the rampant occurrence of tuberculosis both in cattle and cattle raising families in Wolaita, indicating either one serving as the source of transmission to the other.

**Key words:** prevalence, risk factor, tuberculosis, zoonosis


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**Abstract:** Across-sectional survey was conducted in dairy cattle, and dairy workers in selected sites of Ethiopia to determine the prevalence of bovine tuberculosis in cattle and its potential risk in cattle handlers (owners and dairy workers) using comparative intradermal tuberculin test, questionnaire survey and culturing of sputa and milk. The overall prevalence was 35%. The highest prevalence was recorded in Eastern Shewa
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while the lowest was recorded in Wolaita Soddo. The rate of reactors was higher (p<0.05) in government owned large scale dairy farms than in privately owned small scale dairy farms. Out of 30 milk samples drawn from reactor cows 4 stains of *Mycobacterium bovis* (*M. bovis*) were isolated on the basis of growth characteristics and biochemical tests. Similarly, 2 strains of *M. bovis* were isolated from the sputa of dairy workers using the same methodologies. The result of questionnaire survey conducted at Wolaita Soddo on households who own cattle indicated statistically significant (p<0.05) association between reactor cattle and confirmed TB patients among family members of cattle owners. In conclusion, the involvement of the government in the issue of bovine tuberculosis was underlined and possible control methods were forwarded considering the status of the country.

Key words: Dairy Cattle, Cattle handlers, *Mycobacterium bovis*.

**Henok Ayalew¹, Amare Birhanu¹ and *Biruhtesfa Asrade², 2013. Review on food safety system: Ethiopian perspective, Afr. J. Food Sci., 7(12): 431-440**

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**Abstract:** Ensuring food safety to protect public health remains a significant challenge in both developing and developed countries. In the last decade, large efforts have been made on the global level towards development and implementation of food safety management systems to assure food safety in the agri-food chain. Current and new challenges to food safety include changes in animal husbandry, food or agricultural technology, lifestyle and consumer demands and others. In Ethiopia, key stakeholders involved in food safety management include Ministry of Health, Ministry of Agriculture, Quality and Standards Authority of Ethiopia, Environmental Protection Authority, Ministry of Industry, Ministry of Trade, different Federal and Regional Governmental Bodies, Research Institutions, Ministry of Education, Food Manufacturers, Food distributors and Hotels. Even though effective food safety systems are vital to maintain consumer confidence in the food system and to provide a sound regulatory foundation for domestic and international trade in food, there are gaps in Ethiopian food safety system on legal and policy frame work, food-borne diseases surveillance, coordination of organizations involved in food safety management, and laboratory services for relevant food hazards. Lack of appropriate food safety assurance systems are problems that have become obstacles to Ethiopia’s economic development and public health safety. There is no appropriate policy framework that guides food safety management. Initiating the establishment of National food safety Authority/policy, upgrading the capacity of existing public health laboratory, personnel, food-borne diseases surveillance, and legal and policy frame work are as such suggested to overcome these problems.

Key words: Ethiopia, food safety, regulatory body, policy.

**Jemere Bekele¹, Martha Tariku¹ and *Rahmeto Abebe¹, 2011. External parasite infestations in small ruminants in Wolmera District of Oromiya Region, Central Ethiopia, Journal of Animal and Veterinary Advances, 10(4): 518-523**

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**Abstract:** A cross-sectional study aimed at determining the prevalence and identifying the major species of external parasites in small ruminants was carried out in seven localities (peasant associations) of Wolmera district from October 2008 to April 2009. External parasites were collected manually by hand or using forceps (for ticks). Specimens were preserved in 70% ethanol and subsequently examined in the laboratory for identification. Out of 322 sheep and 130 goats examined, 99.38% of sheep and 96.92% goats were infested with one or more external parasites. Seven genera of external parasites were identified in both sheep and goats which belong to lice, ticks, fleas and sheep ked. *Damalinia ovis* (83.23%) was the most dominant of all external parasites identified in sheep while *Amblyomma variegatum* (66.15%) was the uppermost of other external parasites in goats. Moreover, external parasites like *Damalinia caprae*, *Linognathus ovis*, *Linognathus stenopsis*, *Boophilus decoloratus*, *Rhipicephalus evertsi*, *Melophagus ovinus* and *Ctenocephalides* species were detected at different degrees of magnitude. This finding has unveiled that external parasites are major problems in small ruminants in the study area. Lacks of awareness about the significance of the problems among owners and inaccessibility for control schemes have contributed to the
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widespread nature of external parasites in the area. In view of the significance of skin and hide production as a main source of foreign currency to the country and the ever increasing demands of livestock market, the high prevalence of external parasites prevailing in small ruminants in the area requires serious attention at the district level to minimize the effect of the problem.

Key words: External parasites, prevalence, sheep, goats, Wolmera district, Ethiopia


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Abstract: A cross-sectional study to determine the prevalence and estimate financial losses due to hydatidosis in cattle slaughtered at Mizan Teferi and Teppi abattoirs was carried out from October 2010 to April 2011. Out of the total 382 cattle slaughtered and examined visually and manually (palpation and incision), 43 (11.26%) were infected with hydatid cysts, harboring one or more cysts in different visceral organs (lung, liver and kidney). Only body condition had shown a significant association with regard to cyst detection (P<0.05). Out of 43 infections detected from different organs, 26 (60.47%), 14 (32.56%) and 3 (6.98%) were found from the lung, liver and kidney respectively. On the other hand, size category of cysts indicated that 16 (37.2%) were small, 12 (27.9%) medium and 15 (34.9%) large. No detectable cysts were found in the heart and spleen. Of the 43 hydatid cysts collected and examined for the status of fertility, sterility or calcification, 13 (28.9%) were fertile, 21 (46.67%) sterile and 11(24.4%) calcified. And out of 13 fertile cysts, 6(13.3%) were viable and 7(15.56%) were non viable. In the current study, the annual economic loss due to bovine hydatidosis at Mizan Teferi and Teppi municipal abattoirs due to offal condemnation and carcass weight loss was assessed and estimated at 127,456.3 ETB (7,497.43 US$; 1US$= 17 ETB). Considering the current result, hydatidosis is occurring in a moderate frequency in those areas supplying cattle for slaughter at Mizan Teferi and Teppi municipal abattoirs than it has been encountered elsewhere in Ethiopia. However, there seems an existing socio-economic situation favourable for hydatidosis and hence the issue should not be undermined. For that reason, it remains one of the most important diseases warranting serious attention for prevention and control actions in Mizan Teferi and Teppi areas. Thus, establishment of well equipped standardized abattoirs, creation of public awareness and control of stray dogs are paramount importance.

Key words: Abattoir, Hydatidosis, Cattle, Financial Loss, Mizan Teferi, Teppi

*Kassahun Asmare¹,², Skjerve E²., Jemere Bekele¹, Desie Sheferaw¹, Stachurska-Hagen T². and Robertson L.J.²., 2014. Molecular identification of Neospora caninum from calf/foetal brain tissue and among oocysts recovered from faeces of naturally infected dogs in southern Ethiopia, Acta Tropica 130: 88-93

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Abstract: This study sought to confirm and investigate further recently published information regarding the occurrence of Neospora caninum in cattle in Ethiopia and investigate infection in dogs, the canine definitive host, in this region. Faecal samples from 383 dogs in Hawassa, Ethiopia were examined by microscopy for Neospora-like oocysts, and positive samples then analyzed by a molecular approach (DNA isolation, PCR and sequencing at the ITS1 gene). Brain tissue samples from four late term aborted foetuses, one congenitally defective calf (hind leg arthrogryposis) and placental tissue from cattle in the same area were also examined by the same molecular approach. All foetal, calf and placental tissue were associated with Neospora seropositive dams. A high prevalence of Neospora-like oocysts (11.5_m±1.5_m diameter) was observed in faecal samples from dogs (37 positive samples; 9.7% prevalence), and in 17 of these the identification was confirmed by PCR, giving a prevalence of confirmed infection of 4.4%. N. caninum DNA was also detected in all foetal and calf brain tissue samples. Sequencing revealed only minor differences
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among all PCR products, whether from oocysts or from brain tissue samples. These data provide molecular evidence of the presence of *N. caninum* infection in both dog and cattle in this region of Ethiopia. Moreover these findings highlight the role of dogs in maintaining and spreading the infection horizontally in the study area. The high frequency of *N. caninum* infection in household dogs as well as farm dogs is worthy of further investigation.

**Key words**: *Neospora caninum*, Dog, Calf, ITS1, Oocyst

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Kassahun Asmare¹, Berhanu Sibhat², Molla W³, Gelagay Ayelet⁴⁵, Shiferaw Jenberie⁴, Martin A.D.⁶, Skjerve E⁷, and Godfrid J.⁷, 2013. The status of bovine brucellosis in Ethiopia with special emphasis on exotic and cross bred cattle in dairy and breeding farms, *Acta Tropica* 126: 186-192

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**Abstract**: A cross-sectional study was conducted to investigate the seroprevalence of brucellosis and identify risk factors in exotic and cross bred cattle in Ethiopia. A total of 2334 cattle from 273 farms were tested serially for *Brucella* antibodies using the Rose Bengal Plate Test (RBPT) and the Compliment Fixation Test (CFT). The overall animal level seroprevalence was 1.9% (95% CI: 1.2, 2.6), with urban and peri-urban dairy 2.4% (95% CI: 1.4, 3.4), commercial 1.5% (95% CI: 0.5, 2.5) and breeding farms 1.5% (95% CI: 0.2,3.2). The overall farm level prevalence was 10.6% (95% CI: 6.9, 14.3), with 8.6% (95% CI: 4.8, 12.4) in urban and peri-urban dairy followed by 16.9% (95% CI: 7.3, 26.6) in commercial and 20.0% (95% CI: 0.0,59.4) in breeding farms. At individual animal level, purchased cows and adult age groups were observed to associate with *Brucella* seropositivity while presence of small ruminants on the farm was the only factor associated with increased risk of herd level *Brucella* infection. The lack of association between reproductive disorders and *Brucella* seroprevalence suggest that other causes largely outweigh as causes of the aforesaid disorder in studied production systems and demands an investigation. Finally, the need for isolation and characterization of circulating *Brucella* spp. and institution of regulatory measures to reinforce farm biosecurity was suggested.

**Key words**: Bovine brucellosis, Herd, Seroprevalence, Biosecurity, RBPT, CFT

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**Abstract**: Caprine brucellosis in Ethiopia is less commonly reported with limited information on the disease status in the country. The objective of this study was therefore to highlight the status of goat brucellosis in three distinctly different livestock production systems of southern and central Ethiopia. A total 3,315 goats of different age and sex, living with other animals in variable flock size, were sampled from 448 flocks raised in sedentary, pastoral and agro-pastoral production systems. Goats were bled aseptically and sera were collected for serial testing using Rose Bengal Plate Test as screening test and subsequently complement fixation test as confirmatory test. Questionnaire and laboratory data were analysed for descriptive,
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univariable and multivariable logistic regression analysis both at individual and flock level (STATA 11). The study revealed an overall animal level seroprevalence of 1.9% (95% CI 1.5, 2.4). In sedentary production system, the observed seroprevalence was 0.6% (95% CI 0.2, 0.9) while 1.9% (95% CI 1.1, 2.7) and 7.6% (95% CI 5.1, 10.1) were the proportion of seroreactors for agro-pastoral and pastoral production systems, respectively. The observed prevalence difference between the three production systems was statistically significant (P < 0.05). At the flock level analysis, 11.2% (95% CI 8.2, 14.1) of the flocks sampled had at least one seropositive goat among themselves. Like individual level analysis, the highest prevalence of 32.5% (95% CI 21.9, 43.0) was recorded for pastoral production system, followed by agro-pastoral, 13.0% (95% CI 7.0, 19.0) and sedentary production system, 3.6% (95% CI 1.3, 6.0). Accordingly, the odds of Brucella seropositivity were higher (OR = 12.8) in pastoral followed by agro-pastoral (OR = 4.0) in relation to sedentary production system. Large numbers of seroreactors were observed in adult age living in larger flocks with other livestock species. However, no difference was noted between male and female goats. Finally, the need for nationwide survey and subsequent designing and implementation of appropriate control measure is suggested.

Keywords: Caprine brucellosis, Goats, Production systems, Risk factors, Seroprevalence

Kassahun Asmare¹,², Fekadu Regassa³, *Robertson L.J², Martin A.D⁴, and Skjerve E², 2013. Reproductive disorders in relation to Neospora caninum, Brucella spp. and bovine viral diarrhoea virus serostatus in breeding and dairy farms of central and southern Ethiopia, Epidemiol. Infect. 141(8): 1772-1780

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Summary: Abortion and stillbirth are important reproductive disorders in the dairy industry and are often caused by infectious agents. This study investigated whether bovine viral diarrhoea virus (BVDV), Brucella spp., and Neospora caninum are associated with abortion and/or stillbirth in dairy cattle in Ethiopia. Dairy cattle from 99 farms were categorized as cases (n=134) or controls (n=268) according to reproductive data. Blood samples were screened for antibodies for these infectious agents. The overall proportion of cattle that were seropositive for BVDV, Brucella spp., and N. caninum was 11.7%, 3.2%, and 17.2%, respectively. Seropositivity for BVDV and Brucella spp. was similar for cases and controls, but significantly more cases were seropositive for N. caninum (29.8%) than controls (10.8%). This is the first report demonstrating N. caninum is common in dairy cattle in Ethiopia, and is probably a greater impediment to reproductive success in Ethiopian dairy farms than either BVDV or Brucella spp.

Key words: Animal pathogens, Brucella, parasites, veterinary epidemiology, virus infection.

*Kassahun Asmare¹,³, Fekadu Regassa², Robertson L.J³, Martin A.D⁴, and Skjerve E², 2013. Seroprevalence of Neospora caninum and associated risk factors in intensive or semi-intensively managed dairy and breeding cattle of Ethiopia, Veterinary Parasitology, 193(1-3): 85-94

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Abstract: A cross-sectional study of Neospora caninum infection was conducted in major milksheds of Ethiopia. Cattle (n = 2334) from 273 farms were bled and the sera screened for antibodies against N. caninum using a commercial ELISA kit. Herd and individual animal level data were collected from farm records and a semi-structured questionnaire format. The overall animal level seroprevalence was 13.3%, while the prevalence at farm level was 39.6%. In urban and peri-urban smallholder dairy farms, the seroprevalence was 14.9%, while 12.9% and 9.8% reactors were found among commercial dairy farms and breeding cattle, respectively. At farm level, 35.7% of urban and peri-urban farms, 47.5% of the commercial farms and five of the breeding farms were found to have at least one infected animal. Purchased cows (OR:
2.3) and cows with history of maternal reproductive disorders (OR: 2.1) were associated with seropositivity at the individual animal level. Crossbred cattle (Holstein-Friesian crossed with indigenous zebu) were associated with lower risk than pure breeds (OR: 0.6). A trend of prevalence increment was observed for large herd sizes (OR: 1.8). Other factors that were associated with seropositivity were: presence of farm dogs for more than 5 years (OR: 1.9), access to farm by wild carnivores (OR: 3.1) and compromised farm hygienic status (OR: 3.4). Abortion, retention of foetal membrane and metritis were the most frequently reported clinical reproductive disorders among seropositive cattle. Together, these finding indicate that *N. caninum* infection is highly prevalent, widely distributed and clinically important in dairy and breeding cattle of Ethiopia. *N. caninum* should be considered an important infectious cause of reproductive disorders in Ethiopian cattle, and the risk factors for exposure identified here should be used as basis for implementing control measures that could limit the transmission of this infection.

**Key words:** Breeding farm, Dairy, *Neospora caninum*, Risk factors, Ethiopia

*Kassaye Aragaw¹, Yehualashet Negus¹, Yifat Denbarga¹ and Desie Sheferaw¹, 2012. Fasciolosis in Slaughtered Cattle in Addis Ababa Abattoir, Ethiopia. Global Veterinaria, 8(2): 115-118

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**Abstract:** A cross-sectional study to estimate the prevalence of fasciolosis in slaughtered cattle was conducted between November 2010 and April 2011 in Addis Ababa abattoir, Ethiopia. A total of 600 livers from cattle selected with systematic random sampling were examined for presence and burden of liver fluke. Of 600 examined cattle, 122 (20.3%) were infected with *Fasciola*. Both species of *Fasciola* were identified during the study. *Fasciola hepatica* was recovered from the livers of 91 (15.2%) cattle while *F. gigantica* was collected from 19 (3.2%) livers. Mixed infection with both species was observed in 7 (1.2%) animals and 19 (3.2%) cattle were infected with unidentified immature liver flukes. Worm count on the 122 infected livers revealed a mean fluke count of 73.5 per liver, with maximum and minimum fluke count of 152 and 2 respectively. *Fasciola* infection was highly associated (P <0.001) with body condition. Animals with lean body condition were 6.9 (95%CI=3.60 - 13.15) times more likely to be infected as compared to fat cattle. It is concluded that fasciolosis, due to *F. hepatica* and *F. gigantica*, is prevalent in cattle in Ethiopia.

**Key words:** Abattoir, Cattle, Ethiopia, *Fasciola*, Prevalence


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**Abstract:** A three-year longitudinal study was conducted to evaluate effects of strategic anthelmintic treatment regimes on age at first lambing (AFL), weight at first lambing (WFL) and lambing interval (LI) of 356 communally grazed ewes and675 lambs owned by 10 smallholder farmers in the central highlands of Ethiopia. The ewes were stratified by weight and randomly allocated to three treatment groups as untreated control (TG1), twice-dosed per year (TG2) for both nematodes and trematodes in mid-January and mid-June and four-time-dosed per year (TG3) in June for nematodes, in August–September for nematodes and adult Fasciola, in November–December and January–February for immature flukes. The fixed effect of anthelmintic treatments, parity, season and year of lambing on AFL and LI was evaluated. Mean±standard error (SE) of lambing interval was 292±3 days. Both anthelmintic treatments (TG2 and TG3) shortened (Pb0.01) LI by about 23 days compared to non-treated ewes (TG1). Season and year of lambing had a significant (P<0.001) effect on LI. Mean±SE of AFL and WFL was 598±10 days and 17.2±1.37 kg, respectively. Anthelmintic treatments and parity of dam of the ewe lamb did not affect AFL (PN0.05). Birth and lambing seasons of the ewe lamb had significant (Pb0.05) effect on AFL. On the other hand, lambing season of the ewe had significant (Pb0.05) effect on WFL. Ewe lambs born in the long rains lambed more than 50 days earlier than the ewe lambs born in short rainy and dry seasons. Lambing occurred year-round
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with two peaks in August–September and December–January, each 5 months after the two rainy seasons. Anthelmintic treatment at the beginning of the two rainy seasons should improve reproductive performance of Menz ewe lambs in similar agroecology in the central highlands of Ethiopia.

**Key words:** Age at first lambing, Communal grazed ewes, Ethiopia, Lambing interval, Strategic de-worming, Weight at first lambing


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**Abstract:** A bacteriological study of Salmonella Gallinarum/Pullorum was conducted in intensively managed chickens in Hawassa, Ethiopia between November 2008 and May 2009. The objectives of the study were to estimate the bacteriological prevalence of S. Gallinarum/Pullorum in apparently healthy chickens and to assess the proportional morbidity/mortality from S. Gallinarum/Pullorum in sick/dead chickens. Cloacal swabs were collected from a total of 380 randomly selected chickens from 3 poultry farms to estimate the prevalence, whereas necropsy samples of liver, spleen and ceca were collected from 31 sick/dead chickens to estimate the proportional morbidity/mortality. The prevalence of Salmonella infection (S. Gallinarum/Pullorum) was 0.8% (3/380), while isolation was possible from 16.1% (5/31) sick/dead chickens. Only S. Gallinarum was isolated from cloacal swabs. Of the 6 isolates obtained from necropsy samples 1 was S. Pullorum and the rest 5 S. Gallinarum; and, 3 were from liver, 2 from cecum and 1 from spleen. It is concluded that salmonellosis is prevalent and fowl typhoid and pullorum disease have significant role in morbidity and mortality of intensively managed chickens in Hawassa. This result may indicate the challenge that the poultry industry of the country may face from S. Gallinarum/Pullorum in the future in its intensification. Concerted efforts, therefore, should be made at national and local levels to control the diseases.

**Key words:** Ethiopia, Hawassa, Isolation, Prevalence, Salmonella, Gallinarum-Pullorum

Kassaye Aragaw¹, *Bayleyegn Molla², Muckle A³, Cole L³, Wilkie E³, Poppe C³, Kleer J⁴ and Hildebrandt G⁴, 2007. The characterization of Salmonella serovars isolated from apparently healthy slaughtered pigs at Addis Ababa abattoir Ethiopia. Preventive Veterinary Medicine, 82(3-4): 252-261

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**Abstract:** We looked for Salmonella in all 278 apparently healthy pigs slaughtered between September 2004 and May 2005 at the only pig-slaughtering slaughterhouse in Addis Ababa, Ethiopia. We used standard methods and tested caecal contents, mesenteric lymph nodes, and carcass swabs from each pig (missing only one carcass swab). Of the 278 pigs, 120 (43%) were positive; of the 833 samples 173 (21%) were positive. Thirty-three percent of the isolateswere multi-resistant (including 46/48 isolates of S.Hadar, but none of the 39 isolates of S. Eastbourne or of the 37 of S. Saintpaul). Resistance to streptomycin (32.4%), tetracycline (31.8%) and nitrofurantoin (27.2%) was relatively high. The most common pattern of MDR observed was to nitrofurantoin, streptomycin and tetracycline (Resistence type NitStrTet). Our results indicate that salmonellae are prevalent in pigs slaughtered at Addis Ababa abattoir and a large proportion of the isolates were multi-drug resistant.

**Key words:** Pigs; Salmonella; Characterization; Multi-drug resistance; Addis Ababa abattoir; Ethiopia
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*Kebede Amenu*¹,², André Markemann² and Anne Valle Zárate³, 2013. Water for human and livestock consumption in rural settings of Ethiopia: assessments of quality and health aspects, Environmental Monitoring and Assessment, 185(11): 9571-9586

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Abstract: The study aimed to assess the quality and health aspects of water intended for human and livestock consumption in two rural districts of the Rift Valley of Ethiopia. The study involved two parts: the first consisted of a questionnaire survey and farmers’ group discussions, complemented by secondary health data, and the second part determined the chemical (total dissolved solids, pH, manganese, hexa-valent chromium, fluoride) and microbiological quality of different water sources during dry and wet seasons. The result showed a lack of sustainable access to safe water in the communities. Industrial pollution and mismanagement of water sources by human and livestock was found to be a source of potential health risk. Potentially linked human health problems like malaria, diarrhoea and gastrointestinal parasites were common in the districts. Overall, 76 % of the assessed water sources (n=25) failed to comply with World Health Organization guidelines for human drinking water, for at least one assessed parameter, mostly irrespective of the season. The non-compliance was mainly attributed to Escherichia coli contamination and/or high fluoride concentration. At least 20 % of the water samples were also found to be unfit for livestock consumption based on assessed chemical parameters in both dry and wet seasons. To minimize the health risk associated with mismanagement and poor quality of water sources in the area, targeted action in the protection of surface water sources should be given priority.

Key words: Water access, Water quality, Rural community, Livestock, Health, Ethiopia

*Kebede Amenu*¹,², André Markemann¹, Regina Roessler¹, Marianna Siegmund-Schultze¹, Girma Abebe³ and Anne Valle Zárate¹, 2013. Constraints and challenges of meeting the water requirements of livestock in Ethiopia: Cases of Lume and Siraro districts, Tropical Animal Health and Production, 45(7): 1539-1548

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Abstract: Compared to the total water use in livestock production systems, water for livestock drinking is small in amount but is an important requirement for health and productivity of animals. This study was carried out to assess constraints and challenges of meeting drinking water requirements of livestock in rural mixed smallholder crop–livestock farming districts in the Ethiopian Rift Valley area. Data was collected by individual interviews with randomly selected respondents and farmer group discussions. Farmers ranked feed and water scarcity as the two most important constraints for livestock husbandry, although the ranking order differed between districts and villages. Poor quality water was a concern for the communities in proximity to urban settlements or industrial establishments. Water provision for livestock was challenging during the dry season, since alternative water sources dried up or were polluted. Though rainwater harvesting by dugout constructions was practiced to cope with water scarcity, farmers indicated that mismanagement of the harvested water was posing health risks on both livestock and people. A sustainable water provision for livestock in the area, thus, depends on use of different water sources (intermittent or perennial) that should be properly managed. Industrial establishments should adopt an environment friendly production to minimize pollution of water resources used for livestock consumption. Technical support to farmers is required in proper design and use of existing rainwater harvesting systems. Further investigations are recommended on effect of poor quality water (perceived by farmers) on performance of livestock.

Key words: Water scarcity, Poor water quality, Livestock production, constraints, Farmers' perception , Ethiopia
Glossina sampling and identification were employed for both entomological and parasitological examination. There species of the genus was found to be significantly (\(\chi^2 = 49.5, p < 0.05\)). About 95.2% of cattle that were positive for trypanosomes had a PCV less than the lower limit for cattle.

Glossina activities in the settlement areas of the Hawa-Gelan district and seems to be associated with the presence of density of (57.2%). Out of a total 389 cattle examined, 42 (10.8%; 95% CI: 7.89% – 14.3%) were found infected with (54.8%), trypanosomes. Three trypanosome species were detected in the study area, namely \(Trypanosoma brucei\) (23.8%) and \(Trypanosoma congolense\) (21.4%). The prevalence of trypanosomosis was found to be significantly (\(p < 0.05\)) higher in cattle with poor body condition. There was an association between mean packed cell volume (PCV) and the occurrence of parasitaemia (\(\chi^2 = 49.5, p < 0.05\)). About 95.2% of cattle that were positive for trypanosomes had a PCV less than the lower limit for cattle. Considering the current result, bovine trypanosomosis is seems to be a serious constraint for agricultural activities in the settlement areas of the Hawa-Gelan district and seems to be associated with the presence of \(Glossina\) species. Therefore, application of control methods through community involvement to reduce the \(Glossina\) species infestation level is likely to increase animal productivity.

Abstract: A study was carried out in Arsi-Negele District of Southern Ethiopia to estimate the prevalence of brucellosis and bovine tuberculosis in livestock and to identify risk behaviours that would facilitate the transmission of zoonoses to humans. The study involved testing some 400 cattle, 200 sheep and 170 goats for tuberculosis and brucellosis and interviewing 98 livestock keepers. Single comparative intradermal tuberculin test and Rose Bengal plate test were used for the diagnosis of tuberculosis and brucellosis, respectively. Tuberculosis was recorded in 27 cattle, 1 goat and 1 sheep. In cattle, the estimated individual level and herd-level tuberculosis prevalence was 5.9% and 35%, respectively. The individual-level and herd-level brucellosis prevalence in cattle was 2.6% and 12%, respectively. The questionnaire survey showed that most respondents had no accurate knowledge about the transmission of zoonoses. It was also found that some of their behaviours would potentially facilitate the transmission of zoonotic pathogens to human, such as raw animal product consumption and backyard slaughtering. Even though the prevalence of the two diseases was relatively low, surveillance and prevention may be warranted taking into account possible animal genetic improvement programs, unrestricted animal movement in the area and low awareness of the community about zoonoses, which might result in an increased transmission to humans.

Key words: Zoonoses- Awareness- Livestock- Tuberculosis- Brucellosis- Ethiopia


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Abstract: A cross-sectional study aimed at investigating the species diversity of fly vectors and estimating the prevalence of bovine trypanosomosis was carried out from October 2009 to May 2010 in selected settlement areas of the Hawa-Gelan district in the western Wollega zone of Ethiopia. Standard methods of sampling and identification were employed for both entomological and parasitological examination. Three species of the genus \(Glossina\) (\(Glossina pallidipes\), \(Glossina morsitans submorsitans\) and \(Glossina fuscipes\)) and two genera of biting flies (\(Stomoxys\) and \(Tabanus\)) were caught and identified. The overall apparent density of \(Glossina\) species caught was 10.5 flies per trap per day, with a higher proportion of female flies (57.2%). Out of a total 389 cattle examined, 42 (10.8%; 95% CI: 7.89% – 14.3%) were found infected with trypanosomes. Three trypanosome species were detected in the study area, namely \(Trypanosoma congolense\) (54.8%), \(Trypanosoma brucei\) (23.8%) and \(Trypanosoma vivax\) (21.4%). The prevalence of trypanosomosis was found to be significantly (\(p < 0.05\)) higher in cattle with poor body condition. There was an association between mean packed cell volume (PCV) and the occurrence of parasitaemia (\(\chi^2 = 49.5, p < 0.05\)). About 95.2% of cattle that were positive for trypanosomes had a PCV less than the lower limit for cattle. Considering the current result, bovine trypanosomosis seems to be a serious constraint for agricultural activities in the settlement areas of the Hawa-Gelan district and seems to be associated with the presence of \(Glossina\) species. Therefore, application of control methods through community involvement to reduce the \(Glossina\) species infestation level is likely to increase animal productivity.
Abstract: Late in 2007, veterinary, medical and anthropological professionals from Europe and Africa met in a 2-day workshop in Pretoria, South Africa, to evaluate the burden, surveillance and control of zoonotic tuberculosis and brucellosis in sub-Saharan Africa. Keynote presentations reviewed the burden of these diseases on human and livestock health, the existing diagnostic tools, and the available control methods. These presentations were followed by group discussions and the formulation of recommendations. The presence of Mycobacterium bovis and Brucella spp. in livestock was considered to be a serious threat to public health, since livestock and animal products are the only source of such infections in human beings. The impact of these pathogens on human health appears to be relatively marginal, however, when compared with Mycobacterium tuberculosis infections and drug resistance, HIV and malaria. Appropriate diagnostic tools are needed to improve the detection of M. bovis and Brucella spp. in humans. In livestock, the ‘test-and-slaughter’ approach and the pasteurization of milk, which have been used successfully in industrialized countries, might not be the optimal control tools in Africa. Control strategies should fit the needs and perceptions of local communities. Improved intersectoral and international collaboration in surveillance, diagnosis and control, and in the education of medical and veterinary personnel, are advocated.


Abstract: A 3-year longitudinal study was conducted to evaluate the effects of strategic anthelmintic dosing on communally grazed village sheep in Gera Keya district in the central highlands of Ethiopia. Ewes were stratified by weight and randomly allocated to three treatment groups: untreated control (TG1), twice-dosed per year (TG2; for both nematodes and trematodes in mid-January and mid-June) and four-time-dosed per year (TG3; in June for nematodes, in August–September for nematodes and adult Fasciola, in November–
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December and January–February for immature liver flukes). The fixed effect of treatment, lamb sex, dam parity, season and year of birth on mortality from birth to 90, 180, 270 and 365 days was analyzed. Least square means of lamb mortality from birth to 90, 180, 270 and 365 days were 11.3, 16.8, 18.0 and 19.5%, respectively. Anthelmintic treatment had significant effect (P < 0.05) on mortality of lambs at all ages: lambs in TG3 had consistently higher mortality than lambs in TG2. The lambs in TG3 were worse in terms of survival from birth to 180 days even when compared with the control group (TG1). Mortality rate in male lambs was twice as high compared to their female contemporaries at all ages (P < 0.001). Season of birth had significant (P < 0.01) effect on lamb mortality at all ages. Lambs born during rainy season had the lowest mortality in the first 6 months (0–90 and 0–180 days) of age than those born during short rainy or dry seasons. Instead of frequent mass drenching, discriminatory drenching on a case-by-case basis should be considered to improve lamb survival.

Keywords: Ethiopia, Menz lambs, Mortality. Risk factors, Strategic de-worming


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Abstract: The purpose of this study was to estimate the prevalence and the distribution of internal organs of cystic echinococcosis on cattle slaughtered in Jimma municipal abattoir from November 2009 to February 2010, Western Ethiopia. Out of 564 cattle 205 (36.3%) were harbored hydatid cyst. The percentage of hydatid cyst in lung, liver, kidney, spleen and heart were found to be 92.7%, 53.2%, 1.5%, 0.5% and 0.5%, respectively. The lung was the most predominantly affected organ followed by the liver. Cattle body conditions significantly affect the prevalence of cystic echinococcosis (= 7.47, P = 0.008) and 2 higher prevalence was recorded in animals with poor body condition. Of 217 cysts collected from the lung 51 (23.5%) were fertile, 117 (53.9%) were sterile and 49 (22.6%) were calcified. Likewise from 124 cysts collected from the liver 18 (14.5%), 34 (27.4%) and 72 (58.1%) were fertile, sterile and calcified respectively. Higher numbers of large and medium sized cysts were found in the lung when compared with other organs. The prevalence of the present study was higher therefore reduction of stray dog population, regular treatment of dogs and fencing the surrounding of the abattoir are the main core points to reduce the prevalence of the disease in the area.

Key words: Abattoir, Echinococcosis Cattle Jimma Ethiopia

Mesele Abera1, Belay Elias1, Kassaye Aragaw1, Yifat Denbarga1, Kebede Amenu1 and *Desie Sheferaw1, 2012. Major causes of mastitis and associated risk factors in smallholder dairy cows in Shashemene, southern Ethiopia, African Journal of Agricultural Research, 7(24): 3513-3518

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Abstract: A cross-sectional study was conducted from October 2010 to May 2011 to estimate the prevalence of mastitis, isolate and characterize major bacterial pathogens and to assess the association of some putative risk factors with occurrence of mastitis in cows in smallholder dairy farms in Shashemene, southern Ethiopia. A total of 245 lactating cows (111 Holstein, 98 Holstein-local Zebu crosses and 36 indigenous Zebus) were examined clinically and California Mastitis Test (CMT) was used to detect clinical and subclinical mastitis. The overall prevalence of mastitis at cow and quarter level was 37.1% (91/245) and 30.0% (288/960), respectively. Seventy (28.6%) cows were with subclinical mastitis while only 20 (8.6%) had clinical mastitis. The prevalence of mastitis significantly (P<0.05) differed with breed, parity, stage of lactation and previous record of mastitis. A total of 217 bacterial isolates were recovered from 288 mastitic milk samples and Gram-positive cocci were the most common pathogens. The pathogens isolated were Staphylococcus aureus (28.1%), other Staphylococcus species (22.1%), Streptococcus agalactiae (10.1%) other Streptococcus species (14.3%), coliforms (22.1% that is Escherichia coli, 10.6%; Klebsiella species 7.8% and Enterobacter species 3.7%), Micrococcus species (1.4%), Pseudomonas species (1.4%) and Bacillus species (0.5%). Therefore, culling of older cows with repeated mastitis records and dry cow therapy will be practiced to reduce the risk of mastitis. Culling of old and chronically affected cows, screening for mastitis, awareness creation among smallholder farmers about the importance of sub-clinical mastitis and milking and barn hygiene should be considered in reducing the effect of mastitis.
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Key words: Bacterial isolates, California Mastitis Test, mastitis prevalence, risk factors, Shashemene.

Mesele Abera¹, Tadios Habet¹, Kassaye Aragaw¹, Kassahun Asmare¹ and *Desie Sheferaw¹, 2012. Major causes of mastitis and associated risk factors in smallholder dairy farms in and around Hawassa, Southern Ethiopia, Trop Anim Health Prod., 44(6): 1175-1179

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Abstract: A cross-sectional study was carried out from October 2008 to May 2009 in smallholder dairy farms in and around Hawassa to estimate the prevalence of mastitis, to isolate and characterize major bacterial pathogens, and to identify possible associated factors. The study involved a total of 201 milking cows randomly drawn from smallholder farms. The prevalence of clinical and subclinical mastitis was determined through clinical examination of the udder and using mastitis indicator paper (Bovivet® indicator paper, Kruuse, Denmark). The prevalence of mastitis at cow and quarter level was 30.3 (61/201) and 10.3 (79/766), respectively. Subclinical mastitis was 25.4% and 5.0% was clinical. Stage of lactation significantly affected (P< 0.05) the prevalence of mastitis, with the highest prevalence observed in the late stage of lactation (41.3%) as compared to early (25.0%) and mid (22.1%) stages of lactation. Floor type and bedding had association (P< 0.05) with mastitis prevalence. Cows housed in concrete-floored houses had lower prevalence (19.0%) of mastitis compared to cows kept in soil-floored houses (47.6%). Mastitis prevalence was low in farms which do not use bedding (37.4%) as compared to farms using hay/straw bedding (37.4%). However, age, parity, and history of mastitis had no association (P>0.05) on the prevalence of mastitis. The pathogens isolated from mastitic cows were Staphylococcus aureus (48.6%), other staphylococci species (15.7%), Streptococcus agalactiae (11.4%), other streptococci (17.1%), Bacillus species (2.9%), and coliforms (Escherichia coli and Klebsiella species) (4.3%). Strict hygienic measure of housing and bedding should be considered, in reducing the prevalence of mastitis.

Key words: Mastitis, Clinical, Subclinical, Risk factors, Bacterial isolates

Mesele Abera¹, Abdi Omar¹, Fufa Abunna¹ and *Bekele Megersa¹, 2010. Udder health problems and major bacterial causes of camel mastitis in Jijiga, Eastern Ethiopia: implication for impacting food security, Tropical Animal Health and Production, 42: 341-347

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Abstract: One hundred and forty-five traditionally kept lactating camels (Camelus dromederius) were examined for mastitis by combination of clinical, mastitis card test and subsequent bacteriological isolation. Clinical and sub-clinical mastitis were prevalent in 8.3% (95%CI = 4.6, 14.4) and 20.7% (95%CI = 14.6, 28.4) of the studied animals, respectively. This gives an overall mastitis prevalence of 29.0% (95%CI = 21.9, 37.2) at animal and 17.9% (95%CI = 14.9, 21.3) at quarter levels. High proportion (33.8%) of lactating camels had blind teats and 5.5% had lesions on udder or teat. Taking clinical mastitis and blocked teats into account, the study revealed that only 57.9% of the camels have four teats for milk production. Out of the 505 quarter milk samples examined, 80 (15.8 %) quarters were positive for indicator paper. Upon subsequent culturing, 68.8% (55 out of 80) of the quarter milk samples yielded bacteria. Staphylococcus, Streptococcus, E. coli and Bacillus species were the major isolates. Mastitis prevalence was significantly (p<0.05) affected by tick infestations, udder lesions, and increased age and parity of the animals. In conclusion, mastitis is a major problem in traditionally managed camels and deserves further attention owning to its potential impact on milk production affecting food security.

Key words: Camels, Mastitis, Card test, Etiology, Prevalence, Risk factors, Ethiopia


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Abstract: A cross-sectional study was carried out from November 2008 to April 2009 to estimate the prevalence of mastitis caused by *Staphylococcus aureus*, to assess the associated risk factors and to determine the antimicrobial resistance pattern in Adama town, East Shoa, Ethiopia. From 102 market-oriented smallholder dairy farms, a total of 300 lactating cows were tested for mastitis using the California Mastitis Test (CMT). One hundred and forty of the cows (46.7%) had mastitis, of which 10.0% (30/300) and 36.7% (110/300) showed clinical and subclinical mastitis, respectively. The quarter level prevalence was 29.0% (348/1200); from which the clinical form was 5.4% (65/1200) and the subclinical was 25.6% (283/1200). Of the 65 quarters with clinical cases, 18 had blind teats while 47 had active mastitis. A total of 140 (30 from clinical and 110 from subclinical cases) milk samples were collected and cultured for *S. aureus* of which 59 resulted in growth of the bacterium (10 from clinical and 49 from subclinical cases). Mastitis prevalence showed significant variation among cows of different age groups (\(p = 0.005\)), different housing systems (\(p = 0.000\)) and at different lactation stages (\(p = 0.016\)). Thus, bovine mastitis was more likely to occur in cows above 6 years of age (OR = 3.4, 95% CI = 0.9, 13.7), that were kept in muddy houses (OR = 5.3, 95% CI = 3.2, 8.9) and were at a lactation stage of above 6 months (OR = 3.6, 95% CI = 1.44, 9.03). The results of antimicrobial susceptibility testing revealed that *S. aureus* was highly susceptible to chloramphenicol (100%) followed by gentamycin (91.7%), kanamycin (88.9%) and streptomycin (86.1%). In contrast, isolates were highly resistant to penicillin (94.4%), trimethoprim sulfamethoxazole (58.3%) and amoxicillin (36.1%). In conclusion, this study confirms the importance of *S. aureus* as a mastitis causing bacterium and identifies risk factors associated with the disease in the Ethiopian setting.

Keywords: Mastitis, prevalence, risk factors, *Staphylococcus aureus*, antimicrobial susceptibility test.

Mesele Abera¹, Tirazu Mohammed¹, *Rahmeto Abebe¹, Kassaye Aragaw¹ and Jemere Bekele¹, 2010. Survey of ixodid ticks in domestic ruminants in Bedelle district, Southwestern Ethiopia, *Tropical Animal Health and Production*, 42(8): 1677-1683

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Abstract: A survey aimed at determining the status of ticks in cattle, sheep and goats in Bedelle district (Southwestern Ethiopia) was carried out from November 2007 to April 2008. Out of the total 330 animals examined, 314 (95.2%) were found to be infested (harbouring of at least a single tick). High rates of infestations were recorded across all three host species. Factors like month of collection, age and sex of host species did not show significant association with infestation rates. A total of 5,507 ticks belonging to three genera (i.e. Amblyomma, Boophilus and Rhipicephalus) were collected during the study period of which six species were identified. The species of ticks encountered comprise of Amblyomma cohaerens (44.1%), Amblyomma variegatum (13.8%), Amblyomma lepidum (1.2%), Boophilus decoloratus (24.9%), Rhipicephalus evertsi evertsi (14.3%) and Rhipicephalus lunulatus (1.7%). As about 86.7% (4,772) of the ticks were collected from cattle, it was recognised that this could be an evidence of host preference where cattle are serving as principal host while sheep and goats serve as alternative hosts. The role of ecological factors and little attention paid by livestock owners for treatment of animals against ticks are suggested to result in the abundance of ticks. Acaricide spraying should be strategically applied to control ticks. Better result could be achieved if an emphasis is being put on spraying cattle. Studies on tick-borne diseases, involvement of wildlife species as well as related factors are recommended as they may provide a valuable basis for designing and launching an all-round control programme in the country.

Keywords: Bedelle, Ixodid ticks, Amblyomma, Rhipicephalus, Boophilus, Abundance

Messele Taye¹, Kelay Belihu², Merga Bekana² and *Desie Sheferaw³, 2012. Assessment of impacts of tsetse and trypanosomosis control measures on cattle herd composition and performance in southern region, Ethiopia, *Trop Anim Health Prod.*, 44(7): 1759-1763

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Abstract: This study was conducted to assess the impact of tsetse and trypanosomosis control measures on cattle herd size and composition, herd dynamics, and milk yield in Wolaita and Gamo-Gofa Zones, southern
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Ethiopia. The study showed that the average number of cattle herd size in tsetse challenged areas was significantly higher than those in tsetse-controlled areas. The number of non-pregnant dry cows, bulls and oxen were significantly higher in tsetse challenged areas than the other two study areas. The rate of cattle addition to and disposal from the herd were significantly higher in tsetse challenged areas. Cows in Southern Tsetse Eradication Project (STEP) and community tsetse controlled areas were able to give 26-27%, 25-29% and 17–21 % more daily milk yield at the beginning, middle and end of lactation, respectively, than those in tsetse-challenged areas. In addition, cows in STEP and community tsetse controlled areas had lactation length longer by 1.20 to 1.35 months; age at first calving was shorter by 5.30 to 5.10 months; and calving interval was shorter by 4.20 to 3.20 months than cows in tsetse-challenged area, respectively. Hence, tsetse and trypanosomosis control both by the community and project would play key role in the improvement of cattle productivity.

Key words: Tsetse, Trypanosomosis, Herd dynamics, Ethiopia

*Mihreteab Bekele¹, Tilahun Gessesse², Yisehak Kechero¹ and Mesele Abera², 2011. In-vitro Anthelmintic Activity of Condensed Tannins from Rhus glutinosa, Syzygium guineensa and Albizia gummiifera Against Sheep Haemonchus contortus, Global Veterinaria, 6(5): 476-484

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Abstract: Experimental study was conducted to investigate in-vitro anthelmintic activities of condensed tannins on egg hatchability and larval development of sheep Haemonchus contortus. In view of that, three indigenous medicinal plant: Rhus glutinosa, Syzygium guineensa and Albizia gummiifera were selected based on their relatively high content of condensed tannins and their aqueous acetone extraction was used for egg hatchability and larval development inhibition assays. The result showed that various concentrations of all three condensed extracts tannins demonstrated statistically significant (P<0.05) dose dependent inhibition of both egg hatchability and larval development. According to ED₅₀ and ED₉₀ values, the condensed tannin inhibiting egg hatching and larval development most potently was Rhus glutinosa followed in descending order of activity by Syzygium guineensa and Albizia gummiifera. Finally, the present study suggests that condensed tannins might be recommended as one of the options for the control of Haemonchus contortus of sheep.

Key words: Anthelmintic, Condensed tannins, Haemonchus contortus, Sheep


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Abstract: A study to estimate the prevalence of sheep and goats skin defect was carried out at Bahir Dar Tannery. A total of 400 (200 sheep and 200 goat) sheep and goat skins were sampled and examined for skin defect at pickled stage. The study showed that there were different skin defects responsible for the decline in quality grades of skin. From the total skin examined, ekek (58.3%), scratch (22.5%), flying defect (13.8) and scar (11.3%) were common defects. For sheep skins ekek (67%), processing defect (12%), scratch (12%) and processing defect (8.5%) were important skin defects and only small number (8.5%) were with no defect. In goats skin, ekek (49.5%), scratch (33%), scar (17.5%) and flying defect (15%) were important defects. Skin quality grades 6 (22.3%), 5 (21.8%) and 4 (18.5%) were frequently observed skin grades. There were unappreciable numbers of rejects (12%) while quality grade 1 was the least frequent (6.3%). Ekek was significantly (p<0.05) higher in sheep skin (53%) than goat skin (23.5%). However; scratch was significantly (p<0.05) higher in goat than in sheep, but other defects were not significantly (p>0.05) different between the two species. Examination also showed that 26 (13.5%) and 22 (11%) were rejected in sheep and goat skins, respectively. Integrated efforts towards good animal husbandry and animal health care are very important for better quality skin. Furthermore, detailed studies on the distribution, seasonal occurrence and the direct and
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indirect economic impact of ectoparasites should be undertaken. Meanwhile, tanneries should collaborate with such studies to maximize the economic gain in the long run.

**Key words**: Ectoparasite, Ekek, Goat Skin, Sheep Skin, Skin Defect, Pickled Skin

*Nebyou Moje¹, Debela Abdeta², Solomon Kebede³, Tesema Terfa⁴ and Alemayehu Regassa¹, 2014. Major causes of organs and carcass condemnation in cattle slaughtered at Nekemte municipality abattoir, East Wollega, Ethiopia, Global Veterinaria, 13 (3): 278-284

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**Abstract**: A cross sectional study was conducted from December 2012 to June 2013 to identify the major causes of organs and carcass condemnation and to estimate the direct financial losses attributed to the condemnation in cattle slaughtered at Nekemte municipal abattoir, East Wollega, Ethiopia. Out of the total 433 randomly selected cattle subjected to antemortem followed by postmortem examination, 104 (24.0%) and 272 (62.8%) were found to have various types of abnormalities, respectively. Emaciation (4.6%), branding (12.5%), lameness 14 (3.23%) and nasal discharge (35.5%) were the dominant abnormalities observed during antemortem examination. From the total organs and carcasses examined; 180 (41.75%) livers, 67 (15.5%) lungs, 7 (1.62%) hearts, 5 (1.15%) kidneys, 3 (0.69%) tongues and 1 (0.23%) carcass were totally condemned while 29 (6.7%, 79kg) carcasses were partially condemned from gross abnormalities (Bruise and abscess) as unfit for human consumption. Major pathological conditions that caused a total condemnation of organs were Hydatid cysts 32 (41.1%), Fasciolosis 32 (17.8%), Pneumonia 6 (9%), emphysema 7 (10.4%), hydro nephrosis 3 (60%), cirrhosis 45 (25%), hepatitis 9 (5%), calcification 18 (10%) and abscessation 2 (1.1%). Risk factors associations showed, statistically significant difference ($x^2=36.26; P =0.014$) between the origins category (Arjo Gudetu, Uke, Jimma Arjo, Sasiga, Getema, Nekemte) and frequencies of organs and/or carcasses condemned based on overall abnormalities. The annual financial loss due to edible organs condemnation in the study period was estimated to be 106,536.9ETB or 5758.75 USD per annum while that of carcass was 7,110 ETB/384.32USD. These huge losses due to observed abnormalities on affected organs and organs warrant appropriate control measures.

**Key words**: Cattle Financial Loss Antemortem Postmortem Organs Condemnation

Nejib Mohammed¹, Messele Taye¹, Amenu Asha² and *Desie Sheferaw³, 2014. Epizootological study of small ruminant gastrointestinal strongyles in Gamo-Gofa Zone, Southern Ethiopia. J Parasit Dis, DOI 10.1007/s12639-014-0528-1(Available in line)

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**Abstract**: The study was conducted with the objective to estimate the prevalence of gastrointestinal strongyles and identifying the prevailing strongyle species Gamo-Gofa Zone. A total of 598 animals (241 sheep and 357 goats) and 45 animals (20 sheep and 25 goats) were examined coproscopically and by post mortem, respectively. The overall coproscopic prevalence of strongylsos in the study area was 51.4 %. Strongyles were more prevalent in sheep than goats (95 % CI is 74.6–84.8 % and 58.6–68.6 % for sheep and goats, respectively; $P< 0.05$). A higher prevalence ($P< 0.05$) of strongyles infection was recorded in the midland and highland than the lowland, and in wet season than the dry season. The mean fecal egg count was found to be significantly higher ($P< 0.05$) in the midland area (908.7 ± 94.5) and in wet season (1,033.7 ± 84.2). The post mortem examination result indicated that the overall prevalence of gastrointestinal strongyles was 97.7 %; and a total of 11 strongyle species were identified of which Trichostrongylus axei, Teladorsagia species, Trichostrongylus colubriformis and Haemonchus contortus were the dominant and with higher load. During this study infection with multiple parasites, 3 and more 3, species were recorded in about 68 % goats and 85 % sheep. This study revealed the very high strongyle prevalence and higher proportion of multiple
parasitism both in sheep and goats. Hence, it suggests the need to the institution of various control measures like strategic anthelmintic treatment for efficient utilization of the available small ruminant resources.

**Key words**: Prevalence, Small ruminant, Faecal egg count, Strongyle, Post mortem, Gamo-Gofa, Ethiopia


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**Abstract**: A cross-sectional study was conducted from November 2009-April 2010 to estimate serprevalence of Brucella infection in camels and to identify risk factors associated with brucellosis infection in camels (camelus dromedaries) in Dire Dawa city administration. A total number of 573 camels in 88 herds were sampled during study period. Out of these, 264 were females while 309 were male camels. All serum samples were initially screened by the rose Bengal plate test (RBPT) and confirmation were made using compliment fixation test (CFT). Accordingly, 9 were seropositive out of the 11 RBPT reactors. The overall seroprevalence of brucella antibodies in camels was 1.6% seroprevalence analysis against associated risk factor showed no significant difference (p>0.05) except reproductive disorder where abortion showed significant difference (p<0.05). In addition, camels that co-exist with small ruminants showed slight statistical difference (p=0.05). During blood sample collection owners showed that as they have no awareness about zoonotic importance of the disease. The owner drink raw milk and all animal owners did not take care of retained fetal membrane and aborted fatuses. Camel brucellosis was found to be well spread in the study area and the management practices and the tradition of using animal products warrant serious endanger of the society to Brucella infection.

**Key words**: Camel us dromedaries, vrucellosis, seroprevalence RBPT, CFT, Dire Dawa, Ethiopia.


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**Abstract**: A cross-sectional study was conducted from October 2009 to May 2010 with the objective of estimating the prevalence of ectoparasites in small ruminants and identifying the potential risk factors in selected areas of Tigray region. A total of 991 small ruminants (600 sheep and 391 goats) were examined for presence of ectoparasites. Accordingly, a total of 310 (51.7 %) sheep and 233 (59.6%) goats were found infested with one or more ectoparasites. The overall prevalence for both host species was 54.8% (n=543). The major identified ectoparasites in sheep were ticks (48%), sheep ked (6.7%) and lice (1.3%) and in goats were ticks (58.8%), lice (6.1%) and fleas (3.1%). Among the risk factors, agro-climatic zone, body condition score, flock size and flock type were found to be significantly associated with the prevalence of ectoparasites in the study area. The prevalence of ectoparasites infestation was significantly higher in small ruminants of the lowland and midland, small ruminants with poor body condition score, large flocks and mixed flocks than in their contemporaries within the same comparison category (P < 0.001). To reduce the high prevalence and impact of ectoparasites on small ruminants appropriate and strategic control measure; extension service aiming at creation of awareness about the importance and control of ectoparasites for smallholder farmers is needed.

**Key words**: Ectoparasites, Prevalence, Risk factors, Small ruminants


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Abstract: A preliminary study was conducted in January 2009 in four peasant associations (PAs) selected from two districts in Benishangul Gumuz Regional State, Northwest Ethiopia to investigate the prevalence and species of trypanosomes infecting donkeys and mules and identify the fly vectors playing a role in the transmission of trypanosomosis. Blood samples were collected from a total of 334 donkeys and 52 mules and examined by dark ground/phase contrast buffy coat technique and Giemsa stained blood smears. Accordingly, trypanosome species were encountered in 6.3% of the examined donkeys (n=21) while none of the mules examined was positive for trypanosome infection. Trypanosomes and tsetse flies were detected in two of the four PAs surveyed (Tsetse adurno and Bamadone) with significant (P=0.004) difference in prevalence. The inability to find trypanosomes in the other two PAs (Ura and Ashura) was most likely due to the absence of appropriate fly vectors. Three species of trypanosomes were detected in donkeys, which in order of predominance were Trypanosoma congolense (52.4%), Trypanosoma brucei (28.6%), and Trypanosoma vivax (19.05%). There was a significant (P=0.008) difference in mean PCV between trypanosome infected and non-infected donkeys. The body condition score of the donkeys was significantly associated with both prevalence of infection (P=0.009) and mean packed cell volume (PCV; P<0.0001). No significant difference was observed between male and female donkeys regarding both prevalence of infection and mean PCV (P>0.05 for each factor). The entomological surveys revealed the presence of Glossina morsitans submorsitans and other biting flies of the family Stomoxys, Tabanus, and Haematopota. In conclusion, the prevalence of trypanosomosis obtained in the current study is generally low compared to previous studies. As the present study design was a cross-sectional, one that only depicts a momentary picture of the infection status in the herd, a further longitudinal study that makes use of more sensitive techniques and entomological survey is recommended.


Abstract: This study was carried out from November 2007 to April 2008 to determine the prevalence of fasciolosis and costs incurred due to liver condemnation and evaluate the sensitivity of direct sedimentation method for diagnosis of fasciolosis in cattle slaughtered at Hawassa Municipal abattoir. A total of 3251 adult indigenous cattle were slaughtered at the abattoir during the study period, of which 931 animals (28.63%) were found to be positive for fasciolosis. There was a statistically significant ($\chi^2 = 33.10$; $p = 0.004$) variation in prevalence between the study months where the highest (35.6%) and lowest (21.03%) prevalence were recorded in February and April, respectively. Fasciola hepatica (58.9%) was the predominant fluke identified compared to F. gigantica (10.6%). Mixed infections by both species and unidentified immature flukes were detected in 14.7% and 15.8% of the affected livers, respectively. The mean fluke burden in the affected livers was 55 flukes per liver. As to the severity of infection, 36.63%, 52.31% and 11.06% were lightly, moderately and severely affected, respectively. Moderately affected livers showed the highest mean fluke count ($69 \pm 1.91$) followed by severely ($48 \pm 1.71$) and lightly affected ones ($25 \pm 1.75$) signifying the presence of acquired resistance and local tissue reaction as chronicity of infection supervenes. Taking liver examination as gold standard for diagnosis of fasciolosis, the sensitivity of the direct sedimentation technique was found to be 67.13% and the specificity 100% with substantial agreement ($k = 0.74$) between the two methods. The financial loss due to liver condemnation was estimated to be 106,400 Ethiopian birr (8312.5 USD) per annum. In conclusion, the observation of such a level of infection in the dry season, high fluke pathogenicity and substantial financial loss associated with condemnation of infected livers warrants the institution of appropriate control measures.

Key words: Cattle, fasciolosis, financial loss, Hawassa abattoir, prevalence, Southern Ethiopia

*Rahmeto Abebe1, Mebrahtu Gebreyohannes1, Solomon Mekuria1, Fufa Abunna1 and Alemayehu Regassa1, 2010. Gastrointestinal nematode infections in small ruminants under the traditional husbandry system during the dry season in Southern Ethiopia, Trop Anim Health Prod., 42(6): 1111-1117

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Abstract: A cross-sectional study was conducted from November 2008 to February 2009 to investigate the prevalence and intensity of infection and risk factors of gastrointestinal (GI) nematodes in small ruminants kept under the traditional husbandry system in two districts in southern Ethiopia. Faecal samples collected from a total of 510 small ruminants (284 sheep and 226 goats) and analysed by a modified McMaster technique revealed that 222 animals (43.5%) were found to be infected with one or more GI nematodes. Five identical genera of nematodes were found in both sheep and goats, which in order of predominance were Haemonchus (56.3%), Trichostrongylus (39.6%), Oesophagostomum (22.9%), Trichuris (21.6%) and Bunostomum (10.4%). No significant (p>0.05) differences were observed between sheep and goats proportions except for Trichuris (p<0.05). In both sheep and goats, most of the animals were heavily infected showing faecal egg counts (FECs) above 1,200 epg. Sheep had a significantly (p<0.05) higher mean FEC than goats. In sheep and goats, both the prevalence of GI nematodes and mean FEC were significantly (p<0.001) associated with body condition score and faecal consistency but not with district, sex and age (p>0.05 for each factor). In conclusion, the observation of a strong association of GI nematodes with poor body condition coupled with heavy intensity of infection in the majority of infected animals and an abundance of nematode genera of widespread economic and pathological significance warrants the institution of appropriate control measures that should necessarily include improvement of the nutritional status of the animals.

Key words: Gastrointestinal nematodes, Small ruminants, Prevalence, Faecal egg counts, South Ethiopia

*Rahmeto Abebe1, Thedrous Fantahun1, Mesele Abera1 and Jemere Bekele1, 2010. Survey of ticks (Acari: Ixodidae) infesting cattle in two districts of Somali Regional State, Ethiopia. Veterinary World, 3(12): 539-543

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Abstract: A cross-sectional study aimed at determining the common tick species and their abundance in cattle was conducted in two districts of Somali regional state from October 2008 to March 2009. During the period, a total of 10,055 adult ticks (Ixodidae) were collected from 496 indigenous cattle. Out of the total tick count, 4304 were males and 5751 were females. Eight similar species of ticks that belong to four genera (Amblyomma, Boophilus, Rhipicephalus and Hyalomma) were identified in the two districts covered by the study with a significant (P<0.001) difference in the relative abundance of most tick species between the districts. R. pulchellus was the most abundant tick species in Fafem district (25.41%), followed by B. decoloratus (24.83%) with H. m. rufipes being the least abundant (2.28%). Conversely, the most abundant tick species in Awubere district was B. decoloratus (21.43%) and A. variegatum (4.2%) was the least. A significantly higher (P<0.0001) overall mean tick burden was seen in Awubere than Fafem district. The mean tick burden was found to be independent of age and sex of the animals (P>0.05). An overall male to female ratio of 0.75:1 was also determined showing the dominance of females. In conclusion, eight different species of ticks were found infesting cattle in the study area. Limited scope of awareness regarding the impact of ticks, lack of adequate veterinary infrastructures and absence of tick control strategy are the major factors accountable for the widespread existence of tick species in the area. For that reason, educating pastoral society on appropriate animal husbandry especially regarding to tick control and creating awareness on tick epidemiology would be imperative to minimize the effect of ticks and ultimately to improve the living standards of the pastoral society.

Key words: Abundance, Awubere, Tick, Ethiopia, Ectoparasite, Blood Parasite, Epidemiology, Tick Borne Disease.


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Abstract: A cross-sectional study was undertaken from September 2004 to March 2005 on 40 dairy farms selected from two study areas located in central Ethiopia to determine the prevalence, species, and the risk factors associated with Cryptosporidium infection. Single fecal samples were collected from a total of 580 calves <12 months of age and examined for the oocysts of Cryptosporidium by centrifugal fecal flotation technique using concentrated sucrose solution. Modified acid-fast staining also was performed to increase the optical contrast and to stain confusing yeasts differentially. The overall point prevalence of the infection was 17.6%. Of the 40 dairies sampled, 26 (65%) had one or more calves shedding Cryptosporidium oocysts. In this study the species of Cryptosporidium circulating in the farms was presumed to be Cryptosporidium andersoni based on morphology of the oocysts and certain epidemiological features of the parasite. The infection was not found to be statistically associated with diarrhea (P>0.05). The parasite was detected in a wide age range of calves, i.e. from 21 to 345-days old calves. Among the several risk factors studied, the hygiene of the calf-rearing houses was the most important factor found to be associated with the likelihood of infection (P<0.05).

Key words: Cryptosporidium, Dairy calves, Prevalence, Risk factors, Species.


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Abstract: A cross-sectional study was carried out to determine the prevalence, species composition, and associated risk factors with Eimeria infection in calves of 40 dairy farms in Addis Ababa city and Debre Zeit town. Of the total 580 calves examined for Eimeria infection, 68.1% (395) were infected with 1 or more Eimeria species. A total of 11 species of Eimeria were identified. The most prevalent was E bovis found in 38.45% of the examined samples. The other species found were E zurii (18.1%), E auburnensis (17.9%), E canadensis (16.9%), E ellipsoidalis (11.2%), E subspherica (6.7%), E cylindrica (6.4%), E alabamensis (4.7%), E wyomingensis (4.3%), E bukidnonensis (3.1%), and E brasiliensis (1.2%). Eimeria oocysts were detected in calves from 15 to 345 days of age. There were no statistically significant (P > 0.05) associations between infection by Eimeria and the presence of diarrhea in examined calves. Agro-ecology and age of the study calves were observed as the most important factors associated with occurrence of Eimeria infections in calves. There was strong association (P < 0.001) between the intensity of infection, age of the calves, and consistency of the feces. The observation of pathogenic species of Eimeria (E bovis and E zurii) in calves in this study suggests that coccidiosis may be contributing to the enteric syndromes affecting calves of the area.

Key words: calf, dairy farm, Eimeria, epidemiology, Addis Ababa, Debre Zeit

Shiferaw Jenberie¹, Stacey E. Lynch²,³, Fekadu Kebede¹, Robert M. Christley³, Esayas Gelaye¹, Haileleul Negussie¹, *Kassahun Asmare⁴,⁵ and Gelagay Ayelet¹,⁶, 2014. Genetic characterization of infectious bursal disease virus isolates in Ethiopia. Acta Tropica, 130(100): 39-43

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Abstract: The objective of the investigation was to characterise infectious bursal disease viruses (IBDV) circulating in commercial and breeding poultry farms in Ethiopia between 2009 and 2011. The nucleotide
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and deduced amino acid sequence for VP2 hypervariable region of ten IBDVs were determined by RT-PCR, sequenced and compared to well characterised IBDV isolates worldwide. IBDV genetic material was amplified directly from bursa or cell passaged material. Phylogenetically, Ethiopian IBDVs represented two genetic lineages: very virulent (vv) IBDVs or variants of the classical attenuated vaccine strain (D78). The nucleotide identity between Ethiopian vvIBDVs ranged between 0% and 2.6%. Ethiopian vvIBDVs are clustered phylogenetically with the African IBDV genetic lineage, independent of the Asian/European lineage. This report demonstrates the circulation of vvIBDV in commercial and breeding poultry farms in Ethiopia.

Key words: Infectious bursal disease, vvIBDV, VP2, RT-PCR, Sequencing, Phylogenetic


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Abstract: A cross sectional study was conducted between November, 2008 and April, 2009 to evaluate (observe) management practices and welfare problems of working equids at Hawassa town, Southern Ethiopia. Six hundred working equids were screened for various lesions on the skin. Sixty animal owners or users were interviewed about management practices. Among studied (observed) equids, 90% were draught, and 10% were pack animals. Fifty two percent (52%), 45 and 3% revealed a thin, medium and good body condition score, respectively. Lesions resulting from limb tethering (94.5%), lameness (89.2%), lesions affecting the lips (88.5%), girth/belly (81%), wither/spine (78.7%) and breast/shoulder (62.8%) were most frequently observed. Tail/tail base (79%), ribs/flank (81%), breast/shoulder (84.5%) and hind quarter (70.7%) lesions were significantly associated with pack type of work (p < 0.05), whereas hip lesion (89.7%) and lameness (91%) were associated with draught type of work (p < 0.05). Poor/thin body condition significantly correlated with wither/spine lesions (p < 0.05). According to respondents, the average daily working time was 7.9 ± 0.2 h with an average burden of 70 kg of goods and 3 persons. The average water supply at a time amounted to 5.75 ± 2.7 liters. Among respondents, 53.3% provided water three times per day, and 41.6% of them only two times/day. The average amount of provided feed was 12.2 ± 3.4 kg twice daily. Shelters were provided for all working equids at home, but only for a few experienced individuals were provision of shelter to equids at work sites. In addition, rubber shoeing was found to be of poorest quality, thus leading to high slip hazard. In conclusion, even though owners/users take care of their animals, a great number of lesions associated with work type and body condition were noted. This finding shows that working equids experience multiple welfare problems in the study area.

Key words: Equids, work type, management, welfare problems, Hawassa, Ethiopia.

Solomon Mekuria1, Addisu Eyob1, Alemayehu Rregassa1, Abebayehu Tadesse1, Birhanu Mekibib1 and *Rahmeto Abebe1, 2011. A cross-sectional study of equine trypanosomosis and its vectors in Wolayta zone, Southern Ethiopia, Journal of Animal and Veterinary advances, 9(15): 2061-2066

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Abstract: A cross-sectional study was conducted from October 2008-April 2009 in Humbo, Kindo Koysha an sodo Zuria districts selected from Wolayta Zone located in Southern Ethiopia to investigate the prevalence an species of trypanosomes infecting equines and identify the fly vectors playing a role in the transmission of trypanosomosis. Blood samples were collected from a total of 214 donkeys, 20 horses and 60 mules an examined by dark ground/phase contrast buffy coat technique and Giemsa-stained blood smears. Accordingly trypanosome species were only encountered in 10.7 % of the donkeys (n=23) while none of the horses an mules examined was positive for trypanosome infection. Two species of trypanosomes were detected if donkeys which in order of predominance were trypanosome congolense (52.2%) and Trypanosmoes viva (26.1%) and mixed infection by both species were found in 21.7% of trypanosome-positive animals. Statistical analysis showed no significant association between prevalence of trypanosome infection and the district, Bod Condition Score (BCS), age and sex of donkeys (p>0.05 in all cases). There
was a highly significant difference (p<0.0001) in mean PCV (%) between trypanosome infected and non-infected donkeys. Similarly female animal had significantly lower (p<0.05) mean PCV (%) than male animals. No significant difference (p>0.05) was observed among the mean PCVs of donkeys infected with different species of trypanosomes. The entomological survey revealed the existence of a cyclical vector *Glossina pallidipes* and other biting flies with a relative proportion of 13.2 and 86.8%, respectively. In conclusion, the prevalence of trypanosomosis obtained in the current study is generally low compared to previous studies and this might be associated with reduction in tsetse density as a result of increased agricultural activities and tsetse control interventions being carried on by governmental and non-governmental organizations in the area.

**Key Words:** Equine, PCV, prevalence, trypanosomosis, vectors, Southern Ethiopia


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**Abstract:** A cross sectional study was conducted from Nov. 2008 to April 2009 to identify and estimate prevalence of ectoparasites of poultry in intensive and backyard chicken farm at Wolayta Soddo town southern nation nationalities and peoples region of Ethiopia. Three hundred eighty four chickens were selected using systematic random sampling technique. Ectoparasites were collected from different parts of the body including skin scraping from shank. Concomitantly age, sex as well as other risk factors recorded. The study result showed that four genus (lice, flea, mite and tick) and six species of ectoparasites recovered in back yard and none in intensive production system. The prevalence of external parasite infestation in backyard production system were 88% lice, 16.5% flea, 8.1% mite and 9.2% tick. *Menopon gallinae* 49 (139/284) the most prevalent ectoparasite species followed by *Cucullotogaster heterographus* 40% (115/284) while *Cnemidocoptes mutans* 8.1% (23/284) was the least identified. The finding in age group showed that there was a significant difference in prevalence of lice infestation between young and adult chicken (P< 0.05) with odds ratio of 5.2. Where young age group are 5.2 times more likely to be infested with lice than adult ones, where as mite prevalence was significantly different between age group with OR of 2.8, where adult group are 2.8 times more likely to be infested than young. On the other hand, flea and tick weren't significantly different (P>0.05) in both age and sex groups but it needs further study to find plausible explanation. The study indicated that external parasites are highly prevalent in backyard chicken, which is associated with poor hygienic system. There is a need to improve hygiene to increase chicken productivity in the area.

**Key words:** Chicken, Ectoparasites, Prevalence, Backyard, Intensive, Commercial Poultry Farm, Wolayta Soddo, Hygiene


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**Abstract:** A cross-sectional study was conducted between November 2009 and December 2009 in the riverbank of Abay river tributaries, located in three districts of Awi and Metekel zones, Northwest Ethiopia. The prevalence of bovine trypanosomosis, associated risk factors and distribution as well as vector identification in the study area were considered. Blood samples were collected from 540 randomly selected local (zebu) breed of cattle in nine peasant associations of three districts and the assumed risk factors were recorded. The collected samples were examined using hematological and parasitological techniques. In this study, sixty-seven animals (12.42%) were infected with different species of trypanosomes. Most of the infections were due to *T. congolense* (77.6%) followed by *T. vivax* (14.9%), *T. brucei* (6.0%) and mixed infection of *T. congolense* and *T. vivax* (1.5%). There was no statistical significance (p > 0.05) between sex, age and coat color of skin, but significant differences were observed in body condition, altitude and districts (p < 0.05). Mean PCV value of infected (19.42%) and non-infected (24.13%) group of animals had significant variation; and mean PCV value of poor body condition was significantly different (p< 0.001)
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from good body condition. A total of 3072 tsetse flies of riverine species or palpalis group (Glossina tachinoides) and biting flies were caught, of these 2792 (90.9%) were tsetse flies and the remaining were Stomoxys and Tabanus. The overall apparent densities of tsetse and biting flies were 6.49 and 0.65 flies/trap/day, respectively and the difference was significant (p < 0.05). The study revealed that bovine trypanosomosis is more prevalent in low land and in poor body condition animals in the study area. Tsetse distribution also coincides with altitude, where there was high tsetse catch in low land, but none in mid land. Therefore, prompt control strategy has to be designed and implemented in the area to minimize the distribution of tsetse as well as trypanosomosis prevalence.

Key words: Trypanosomosis, Prevalence, Tsetse Biting flies, Bovine, Northwest-Ethiopia


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Abstract: A cross-sectional study was conducted between March to June 2006 to assess the major welfare problems and work types of equine at Meskan district of Southern Ethiopia. Four hundred ninety seven working equines comprising 381 donkeys, 107 horses and 9 mules was observed, for the presence of lesions on different parts of the body, ectoparasites, abnormal mucous membrane and body condition status. Among observed animals the percentages were 50.9, 37.4, 5.2 and 6.4 used for draught, pack, ridden and other type of work, respectively. It was observed that the proportion was different between horses (75.7%) and donkeys (44.1%) in draught type of work, where as only 0.93% of horses as compared to 48.6% of donkeys were engaged in pack type of work. Across all species about 96.4% of animals had a poor body condition score of less than 2 (Six point scale; 1: very thin and 5: very fat); whereas 59.8% of horses and 16.3% of donkeys were in poor condition. Skin lesions were observed and compared within species, age group and body condition score. Among lesions, donkeys which were engaged in pack type of work demonstrated higher prevalence in tail/tail base lesions than horse with proportions of 16.0 vs. 0.9% and in ectoparasites (37.3 vs 21.5%), whereas 79.4% vs. 3.4% of lip lesions were observed in horses and donkeys. Based on community interviews the majority of users or owners did not provide water, feed and shelter at the working site. The results of this study indicated that equines were experiencing multiple welfare problems associated with inaccessible water, feed and shelter at the working site and animals were suffering from several lesions.

Key words: Assessment, body condition, health parameters, work type


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Abstract: The study was conducted in two selected districts of Southern Omo zones of Ethiopia, namely Hammer and Benna-Tsemay, during November 2004 and May 2005 to determine the status of contagious caprine pleuropneumonia (CCPP). Participatory disease investigation was conducted in the goat flocks owned by pastoralists of the districts. Participatory methods such as proportionate piling and matrix scoring of diseases were used to characterize major diseases of goats. Clinical and post-mortem examinations and isolation of the causative agent of CCPP were done. Serological tests were conducted using CFT. CCPP (locally termed Sompo) ranked as the first important disease of goats in the study area. Local perception of causes and signs of CCPP were described. Matrix scoring between groups revealed that disease signs and causes showed weak, moderate and good agreement by Kendall’s coefficient concordance (W=0.21–0.99). The overall sero-prevalence of CCPP was 15.5%. The causative agent was isolated from sick animals in the

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**Abstract**: Cassava flour sample fermented with three pure starter cultures of Yeast *Saccharomyces cerevisiae*, *Lactobacillus plantarum* and *Leuconostoc mesenteroides*. Three different inoculum level (0.25 ml, 0.50 ml, and 0.75 ml) were used. 20 gms of cassava samples were fermented to different times (24, 36 and 48 hrs). The samples were withdrawn after each hrs of fermentation and subjected to analysis of pH, MC, CP, FC content of the samples. All fermented samples generally resulted in increased crude protein (CP) and decreased pH, free cyanide and moisture contents. The sample fermented with *L. plantarum* and *L. mesenteroides* for 36 and 48 hrs with 0.25 ml and 0.75 ml inoculums resulted in the highest pH reduction from 6.68 to 3.70, while the least pH reduction was recorded in sample fermented with *S. cerevisiae* at inoculums level of 0.75 ml. The highest CP content increment were recorded on sample fermented by *S. cerevisiae* for 48 hrs with inoculums level of 0.75 ml i.e from 0.71% unfermented to 4.58% fermented sample. The highest free cyanide (FC) reduction was recorded by *L. plantarum* (4.09 mg/g) at 24 hrs of 0.50 ml, followed by *L. mesenteroides* (4.67 mg/g) at 36 hrs of 0.75 ml of inoculum. While the least free cyanide reduction was recorded by *S. cerevisiae* (111.62 mg/g) at 24 hrs of 0.25 ml of inoculum level. The FC content of all fermented sample at three fermentation time and inoculums level was significantly lower (P < 0.05) than the unfermented samples. The FC decreased from 197.19 mg/g to 4.09 mg/g upon fermentation.

**Key words**: Chike, Fermented cassava, Saccharomyces cerevisiae, Lactobacillus plantarum, Leuconostoc mesenteroides


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**Abstract**: The study was conducted from November 2011 to April 2012. Two hundred twenty two sheep and 174 goats’ abomasum were examined according to the standard procedures. The overall prevalence of abomasal nematode was 82% for sheep and 76.4% for goats. The parasitic species specific prevalence was 80.6, 25.7, and 14.8% for Haemonchus species, *Trichostrongylus axei* and *Teladorsagia circumcincta*, respectively in sheep and 75.2, 9.8, 14.2% in goats. Sex related prevalence for sheep was 79.6, 25.7, 17.1% in male and 81.9, 25.5, and 11.7% in female for Haemonchus species, *Trichostrongylus axei* and *Teladorsagia circumcincta* respectively. The sex related prevalence in goats was 71.9, 5.7, 6.1% and 81.6, 21.6, 16.6% for Haemonchus species, *Trichostrongylus axei* and *Teladorsagia circumcincta*, respectively for male and female. The overall mean worm count was 7459.4 for sheep and 6244.9 for goats. The sex related mean worm burden was significantly higher (P<0.05) in female than male for both sheep and goats. Female Haemonchus species Vulvar morphology was characterized and linguiform vulvar morphology was the most and knobbed type vulva morphology was the least frequently identified vulvar type both from sheep and goats’ worms with higher proportions of linguiform vulva from goats than sheep. It was concluded that the variation in prevalence and vulvar morphotype was almost similar with little deviations between sheep
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and goats. So importance of role of sheep to goats or goats to sheep as reservoir should be assessed. Investigations using advanced molecular techniques should be carried on genetic diversity and pathogenicity of Haemonchus in special as drug resistance is another emerging challenge in addition to the economic loss.

Key words: Abomasal nematodes, Haemonchus, Hawassa, prevalence, vulvar morphology.

Wubit W/giorgis¹, Boja Endanu², Asmamaw Kassaye² and *Solomon Mekuria¹, 2013. Age Pattern and Teeth Abnormality Observed in Working Donkeys in Selected Districts of Sidama Zone, Southern Ethiopia, Global Veterinaria, 11(3): 302-309

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Abstract: Cross sectional study was conducted from November, 2010 up to April, 2011 in Dale, Shebedino and Hawassa districts in southern Ethiopia; to estimate age pattern of donkeys; identify teeth abnormality and understand community perception. Five hundred fifty donkeys were sampled from selected districts proportionally. Fifty seven percent were cart and 43% packing donkeys. Age pattern ranged from one year up to 20 years and above. Community perception showed an average age estimate by community increases as conventional age estimate increases. Age pattern indicated that 27.3% samples were within 8-10years and 27.5% were within 12-17 years age groups; the remaining lies below and above the indicated age group. Donkeys above 12 years age group were mainly engaged in cart than pack; with significant difference (p < 0.05). Twelve percent teeth abnormality were observed, of these 41.8%, 31.3% and 26.9% were in Hawassa, Dale and Shebedino districts, respectively; with significant difference (p<0.05). Nine type of teeth abnormality recorded; worn teeth (38.8%) followed by fracture (10.5%), diastema (8.95%) were the major ones. Poor relationship observed between body condition score and teeth abnormality (p=0.52); but significant (p<0.05) number of teeth abnormality recorded in old age group. Twelve focus group discussions indicated that estimated productive life of pack donkeys had median of 13 and mode of 15 years, whereas cart donkeys had median 10 and mode 8years. Estimated life expectancy showed that longer age observed in pack donkey’s than carts. In conclusion the age pattern ranges from 1year up to more than 20years, various types of teeth abnormality recorded, of these worn teeth were dominant in older age group. Pack donkeys had longer age than carts. Therefore: creating awareness and regular teeth assessment is paramount important.

Key words: Age Pattern, Teeth Abnormality, Donkeys, Dale, Shebedino, Hawassa Ethiopia

Yifat Denbarga¹, Bahilibi Woldegebriel² and *Desie Sheferaw¹, 2012. Reproductive Performance of Boran Cows at Tatesa Cattle Breeding Center, Advances in Biological Research, 6(3): 101-105

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Abstract: The reproductive performance of Boran cows at Tatesa Cattle Breeding Center found in Gurage Zone, central Ethiopia, was studied based on individual cow records from November 2009 to April 2010. The overall mean values of age at first calving, calving interval (CI), days open (DO), gestation length (GL) and number service per conception (NSC) were 1729.9, 622.6, 340.3 and 277.7 days and 1.6, respectively. Both parity and season of previous calving had significant (P< 0.01) effect on calving interval. Also, season of previous calving had significant (P< 0.01) effect on the number of service per conception in the breeding center. The short rainy season calving interval was 522.5 days and the number of services per conception was 1.3. It was concluded that the poor reproductive performance of Boran cows in the breeding center could be due to the management system prevailing in the center.

Key words: Calving Interval, Season, Parity, Service Per Conception Ethiopia

Yifat Denbarga¹, Yohannes Menna¹ and *Desie Sheferaw¹, 2013. Mange Mites Infestation of Small Ruminants and the Associated Risk Factors in Wolaita Zone, World Journal of Zoology, 8(3): 299-302

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Abstract: A cross-sectional study was conducted from November 2011 to April 2012 with the objective of estimating the prevalence of mange mites infestation on small ruminants, sheep and goats and identifying the potential risk factors and major species of mites in three agro-ecological zones of Wolaita, Southern Ethiopia. A total of 450 animals were examined, out of these 229 sheep and 221 goats. Among the examined small ruminants, 4.1% and 2.2% goats and sheep were found infested with various species of mange mites. The overall prevalence of both sheep and goats together was 3.1%. Two genera and three species of mange mites were identified, namely *Demodex caprae* and *Demodex ovis* account for 0.9% and *Sarcoptes scabiei* account for 1.8% prevalence. The genus Sarcoptes was more prevalent in the study area. Significantly higher infestation rate of mange mite was recorded in poor body condition small ruminant than the moderate one. From the identified species *Sarcoptes scabiei* and *Demodex caprae* were significantly higher (P*<*0.05) in poor body condition animals. Hence, awareness creation of the sheep and goats breeder by the animal health extension workers will be a key to control and reduce the problem of mange mites.

**Key words:** Sheep, Goats, Mange, Risk factors, Wolaita, Ethiopia


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Abstract: A cross-sectional study was carried out from October 2009 to May 2010 in and around Bahir-Dar town with the objective of identifying the species of lungworm in sheep and assessing the associated risk factors. The number of investigated animals was 384 sheep for coprology and 100 for postmortem examination. Overall prevalence rates of 17.5% and 60% found by coprology and postmortem examination, respectively. The study revealed three species of sheep lungworms in the study area: *Dictyocaulus filaria* (D. *filaria*) (76.1%), *Muellerius capillaris* (M. *capillaris*) (61.2%) and *Prostomulgus rufescens* (P. *rufescens*). (11.9%). *D. filaria* was the predominant species recovered from 76.1% of the positive animals. The prevalence of *M. capillaris* and *P. rufescens* was significantly (P*<*0.05) higher in adult animals, greater than 24 months of age, while infection with *D. filaria* did not show significant variation with age (P*>*0.05). There was no significant (P*>*0.05) difference in the prevalence of lugworm infection between male and female animals. Lungworm infection was significantly (P*<*0.05) associated with the management system of sheep in the area, which is higher in traditional management system. In conclusion, this study showed that lungworm was an important parasite in sheep in the study area and traditional management system was a risk factor for its infection.

**Key words:** Bahir Dar, Ethiopia, Lungworm, Management System, Prevalence, Sheep


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Abstract: A cross-sectional study was carried out to investigate the prevalence of trypanosome infection and the species of trypanosome affecting cattle in four villages of South Achefer district in Amhara regional state. Blood examination conducted on 384 randomly selected cattle showed an overall prevalence of 4.2% without significant difference (P*>*0.05) between the villages. The species of trypanosomes encountered in the current study were *Trypanosoma vivax* and *Trypanosoma congolense* which accounted for 62.5% and 31.25% of the overall infection, respectively. Simultaneous infection with both species was detected in 6.25% of the parasitaemic animals. The prevalence of trypanosome infection did not show significant variation between cattle of different age groups and sexes (P*>*0.05 in each case). There was a significant (P*<*0.05) association between trypanosome infection and body condition score (BCS) of the study animals. The mean packed cell volume (PCV) of trypanosome infected animals was significantly (P*<*0.05) lower than that of uninfected animals. Although the current study indicated low prevalence of trypanosome infection compared with previous studies, the significant impacts of trypanosomosis on cattle production and productivity should not be neglected. Entomological surveys are recommended in the future to generate a complete data on the epidemiology of the disease in the study area.

**Key words:** Cattle, Ethiopia, prevalence, PCV, trypanosomosis

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Abstract: Currently, salmonellosis is one of the major food borne pathogen both in developing and developed countries. Humans encountered this problem by consuming raw or undercooked food especially of poultry and egg products. The objective of the study was to identify and characterize Salmonella species in trans-ovarian contaminated eggs purchased from local markets in Addis Ababa. The study was conducted by using a standard laboratory diagnostic procedure. Isolation of Salmonella species from eggs was done both in solid and liquid media, and among three hundred eighty four (384) clean and non-cracked eggs examined, twenty eggs (5.21%) were positive for Salmonella enteritidis using selinite broth and Rappaport vassiliadis broth as liquid media and xylose lysine desoxycholate (XLD) agar, MacConkey, Salmonella Shigella agar as solid media. S. enteritidis positive eggs (n = 20) when subjected to biochemical test using lysine iron agar (LIA) identified eighteen (4.69%) positive and two (2) negative samples. In this research, some commercial eggs yielded a number of S. enteritidis. This can be attributed to different causes but the most important one is transovarian transmission which implicate the possibility of poor animal health in layer farms. Storage time/temperature play the most significant role for its multiplication.

Key words: Egg, Salmonella enteritidis, Addis Ababa.

DEPARTMENT OF CHEMISTRY

Dye sensitized solar cell using natural dyes extracted from Mulberry (Morus atba Lam) fruit and Akenchira (Striga hermonthica) flower, Journal of Photonics for Energy, 4(1): 043091

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Abstract: This study employs anthocyanin extracts from mulberry (Morus atba Lam) fruit and Akenchira (Striga hermonthica) flower as the natural dyes for a dye-sensitized solar cell (DSSC). The electrodes, electrolyte (I−/I3−), and dyes were assembled into a cell and illuminated by a light with an intensity 100 mW/cm2 to measure the photoelectrochemical parameters of the prepared DSSCs. According to the experimental results, the maximum conversion efficiency of the DSSCs prepared from anthocyanin dyes of Morus atba Lam fruit extract is 0.42%, with an open-circuit voltage (Voc) of 0.54 V, a short circuit current density (Jsc) of 1.38 mA/cm2, and a fill factor (FF) of 0.56. The maximum conversion efficiency of the DSSCs prepared by anthocyanin dye from the flower of S. hermonthica extract is 0.304% with a Voc of 0.52 V, Jsc of 1.01 mA/cm2, and an FF of 0.58.

Key words: Natural dyes, anthocyanin, solar cells, titanium dioxide.
Abstract: A 1:1 mixture of two thiophene based poly(p-phenylene ethynylene)-alt-poly(p-phenylene vinylene) denoted DO-PThE1-PPV2 (D1) and MEH-PThE1-PPV2 (D2), consisting of the same conjugated backbone but different types and volume fraction of alkoxy side chains on the phenylene ethynylene unit, has led to enhanced charge carrier mobility (measured using CELIV technique) as compared to the individual polymers. The resulting ternary blend with PC60BM showed better photovoltaic performance as compared to binary blends from the single polymers mixed with PCBM. This is due to the improved active layer nanomorphology in the ternary system as revealed by AFM studies.


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Abstract: This study was conducted in Wondo-Genet district, Southern Ethiopia to assess the water quality of rural water supply schemes in relation to the sustainability of their service delivery. 28 functional water points were selected randomly, for their assessments. The assessments included sanitary surveillance of water points and water quality analyses. Water samples were analyzed for pH, temperature, total dissolved solids, turbidity, total hardness, fecal and total coliform bacteria, fluoride, chloride, nitrate, manganese, and iron. The results obtained show that most of the 'user perceived' acceptable drinking water quality parameters were within the World Health Organization (WHO) guidelines for drinking water quality, based on aesthetic and taste considerations. Only one dug-well had marginally higher level of total hardness (that is, 220 mg/l of CaCO₃), while four water points had higher turbidity ranging from 8.3 to 64 NTU when compared with the WHO guidelines. In all the sampled water points, the level of iron (<0.009 to 1.25 mg/l), manganese (0.10 to 1.50 mg/l), chloride (0.80 to 62.5 mg/l), and nitrate (0.90 to 12.7 mg/l) were within the WHO guidelines. Fluoride was also found to be below the WHO health based limit (<1.5 mg/l). However, majority (85.7%) of the water points had detectable levels of total coliform bacteria (1 to 68 cfu). On the other hand, it was only in 25% of the water points that fecal coliform bacteria were detected (1 to 10 cfu). This shows that the bacteriological water quality is of concern as majority of the water points had detectable levels of coliform bacteria. Therefore, regular chlorination of water points, particularly dug wells, should continue. Besides, disinfection of water at the household level can be an added advantage.

Key words: Ethiopia, quality, rural, supply, sustainability, water.


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Abstract: Inadequate management of healthcare waste is a serious concern in many developing countries due to the risks posed to human health and the environment. This study aimed to evaluate healthcare waste management in Hawassa city, Ethiopia. The study was conducted in nine healthcare facilities (HCFs) including hospitals (four), health centers (two) and higher clinics (three) in two phases, first to assess the waste management aspect and second to determine daily waste generation rate. The result showed that the median quantity of waste generated at the facilities was 3.46 kg/bed/day (range: 1.48-8.19 kg/bed/day). The quantity of waste per day generated at a HCF increased as occupancy increased (p<0.001). The percentage hazardous waste generated at government HCFs was more than at private HCFs (p<0.05). The proportion of hazardous waste (20–63.1%) generated at the different HCFs was much higher than the WHO recommendation (10-25%). There was no waste segregation in most HCFs and only one used a complete color coding system. Solid waste and wastewater were stored, transported, treated and disposed inappropriately at all HCFs. Needle-stick injuries were prevalent in 25–100% of waste handlers employed at
these HCFs. Additionally, low levels of training and awareness of waste legislation was prevalent amongst staff. The study showed that management of healthcare waste at HCFs to be poor. Waste management practices need to be improved through improved legislation and enforcement, and training of staff in the healthcare facilities in Hawassa.

**key words**: Ethiopia, healthcare facility, needle-stick injury, waste management


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**Abstract**: The management of healthcare waste (HCW) requires special attention due to the risk posed by the presence of hazardous waste. The first step towards this is the issuance of national legislation complemented by policy documents, regulations and technical guidelines. In Ethiopia there is no specific legislation for healthcare waste management (HCWM). However, there are various legislations which may provide a legal framework for the management of HCW. This review assesses the various legislations that are relevant to HCWM. It also looks into the institutional arrangements put in place and waste management practices that prevail in the country. It was found that, although the existing legislations have provisions that may provide a legal framework for the management of HCW in Ethiopia, they are not comprehensive and lack specificity in terms of defining hazardous HCW and its categories; in indicating legal obligations of healthcare facilities (HCFs) in handling, transporting, treating and disposing HCW, and record keeping and reporting. There is overlapping of mandates and lack of co-ordination among various government institutions that are responsible for HCWM. The HCWM practices also do not conform to the principles of waste management in general and HCWM in particular. Thus, to better manage HCW in Ethiopia, a specific and comprehensive legislation and policy document on HCWM with clear designation of responsibilities to various stakeholders should be issued immediately. Moreover, training and awareness raising activities on proper HCWM should be undertaken targeting medical staffs, HCF administrators, waste handlers, policy and decision makers and the general public.

**Key words**: Ethiopia, healthcare facility, legislation, policy, waste management


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**Abstract**: Background: Plants have traditionally been used for treatment of human and livestock ailments in Ethiopia by different ethnic and social groups. However, this valuable source of knowledge is not adequately documented, which impedes their widespread use, evaluation and validation. Here, we recorded indigenous knowledge and standard practices for human and livestock disease control, of three ethnic groups (Aari, Maale and Bena-Tsemay) in South Omo Zone of Southern Nations, Nationalities and Peoples Regional State, Ethiopia. Methods: A cross-sectional study was carried out using a semi-structured questionnaire to document knowledge of 50 traditional healers (40 male and 10 female) in medicinal plant use for treatment of human and livestock ailments. Descriptive statistics were used to analyze and summarize the ethno-botanical data. Results: Ninety-one plants, with claimed medicinal properties against a total of 34 human and livestock ailments, were reported and botanically identified as belonging to 57 genera and 33 plant families. Most of the plant species reported belonged to one of seven major families: *Lamiaceae*, *Solanaceae*, *Menispermiaceae*, *Fabaceae*, *Asteraceae*, *Plumbaginaceae* and *Geraniaceae*. Woody plants (shrubs 21% and trees 29%) were the major growth form used, whilst roots (40%) and leaves (35%) were the major plant...
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parts used in the study areas. Healers mostly practice oral administration of plant preparations (65%). Multiple medicinal plants were cited against particular ailments, and mixing of two or more different medicinal plants (14.3%) against a single ailment was also commonly reported. Conclusion: This study showed that traditional medicine, mainly involving the use of medicinal plants, is playing a significant role in meeting the primary healthcare needs of the three ethnic groups. Acceptance of traditional medicine and limited access to modern healthcare facilities could be considered as the main factors for the continuation of the practice. Documented knowledge of the traditional healers can be used to support the country’s human and livestock health care system and improve lives and livelihoods. Information generated will be used in future studies to validate bioactivity of selected medicinal plants used by traditional healers, so to increase their acceptability in health care systems both nationally and internationally.

Key words: Ethnomedicine; Traditional healers; Medicinal plants; South Omo; Ailments; Informants consensus factor

*Mathewos Anza¹, Erimias Haile¹, Sisay Tadesse¹, Fikre Mammo¹ and Milkayas Endale¹, 2014. A coniferyl alcohol derivative from the roots of Zanthoxylum chalybeum, Journal of Coastal Life Medicine, 2(12): 970-974

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Abstract: Objective: To isolate and characterize chemical constituents of the roots of Zanthoxylum chalybeum (Z. chalybeum). Methods: A number of phytochemical tests were applied to identify the class of compounds present in the CH₂Cl₂/CH₃OH (1:1) root extract. Column chromatographic separation technique was applied to separate the constituents of the CH₂Cl₂/CH₃OH (1:1) root extract and various spectroscopic techniques [UV-vis, infrared radiation, nuclear magnetic resonance (NMR) (1H- NMR, 13C NMR, DEPT-135, COSY, gHSQC and gHMBC)] were used to determine the structures of pure compounds. Results: Phytochemical screening of the CH₂Cl₂/CH₃OH (1:1) root extract of Z. chalybeum revealed the presence of alkaloids, flavonoids, terpenoids, tannins and anthraquinones. Column chromatographic separation of the extract yielded a new coniferyl alcohol derivative, 2, 3-epoxy- 6,7-methylenedioxyconiferyl alcohol (1) together with the known alkaloid, dihydrochelerythrine (2). Conclusions: The present work conducted on the CH₂Cl₂:CH₃OH (1:1) root extract of Z. chalybeum identified various class of compounds present in the root extract. Complete characterization of two compounds were done using spectroscopic

Key words: Z. chalybeum, Rutaceae, Alkaloid, Coniferyl alcohol derivative

*Surendra Babu N¹ and Teshome Abute Lelisho¹, 2012. Computational studies of solvent effects on structure and Vibrational Spectra of isofavonoid 5,7-Dihydroxy-3-(4-hydroxyphenyl)chromen-4-one(Genistein) by ab intio HF and DFT methods, Advances in Applied Science Research, 3(6): 3916-3934

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Abstract: The structural, Vibrational and Raman frequencies of 5,7-Dihydroxy-3- (4 hydroxyphenyl) chromen-4-one (Genistein) has been studied in different solvents (toluene, ethanol, and water) using by ab initio Hartree–Fock(HF) and at the Becke-3-Lee-Yang-Parr (B3LYP) density functional theory (DFT) PCM method at the 6-311G basis set. The influence of these solvents on the optimized geometry, frequency, Mulliscan charge distribution scheme and were studied. The thermodynamic functions of the titled compound have been computed at HF/6-311G and B3LYP/6-311G levels of theory.

Key words: Genistein, HF, DFT, vibrational and Raman frequencies, Mullikan charge, thermodynamic properties.

*Surendra Babu N¹, 2013. DFT studies of molecular structure, equilibrium constant for keto-enol tautomerism and geometrical isomerism (E-Z) of 2-amino-1-phenylpropan-1- one (Cathinone), Advances in Applied Science Research, 4(2): 147-153

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Abstract: Relative tautomerization energies, dipole moments, entropies, enthalpies and Gibbs free energies and the equilibrium contents for the tautomers of cathinone (2-amino-1-phenypropan-1-one) of the two possible (E and Z) isomers was studied by quantum-chemical calculations, using the B3LYP level of calculation with the 6-311G (d,p) basis set in the gas phase with full geometry optimization. The optimized geometries indicate that these molecules show a distinctly non planar configuration. These calculations have been used to establish the most stable tautomer and calculations showed that, the keto form is the most stable form than other isomers in the gas phase and the (Z) isomer is more stable compared to the corresponding (E) isomer.

Key words: Cathinone, density functional theory, keto-enol tautomerism, geometrical isomerism, equilibrium contents.


Abstract: A density functional theory (DFT) calculations were carried out to investigate the relative energies, equilibrium constants and dipole moments of 2-thiouracil in the gas phase and in solutions with different polarities. Solvent effects were examined by means of the selfconsistent reaction field (SCRF) method. All possible tautomers are optimized at the B3LYP/6-311+G(d,p). All calculations indicate that the most stable tautomer for both species, in the gas phase as well as in solution, has the 2TU1 form. In addition to calculate the thermodynamic properties and the inter conversion equilibrium constants for all tautomers. The molar transfer Gibbs energies of $\Delta \Delta G^\text{t}_0$ (solvent1- solvent 2), determines the solvent effect on the position of the equilibrium.

Key words: 2-Thiouracil, DFT method, tautomerism, relative stabilities, equilibrium constants, solvent effect


Abstract: Relative tautomerization energies, dipole moments and polarizabilities for the tautomers of (R) 4-amino-1,2- oxazolidin-3-one (Cycloserine) was studied by quantum-chemical calculations, using the HF and DFT(B3LYP) level of theory with the 6-311+G(d,p) basis set in the gas phase and different solvents using SCRF model, with full geometry optimization. Entropies, enthalpies, Gibbs free energies and equilibrium constants for the tautomerization process of cycloserine were calculated. The calculations showed that, the NH tautomer form is the most stable than OH tautomer form in the gas phase and other solvents. Then important molecular parameters and selected IR frequencies results in the gas phase and solvents were extracted. The stability of the tautomers relate to the nature of solvents. In the solution and with increase of polarity: NH isomers were more stable.

Key words: Cycloserine, Ab intio HF, DFT method, Tautomerism, thermodynamic Parameters, equilibrium constant.


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Abstract: The Quinoxalin-2(H)-one (QO) and its derivatives of 3-methylquinoxalin-2(1H)-one (MQO) and 3-aminoquinoxalin-2(1H)-one (AQO) electrode potentials were calculated in aqueous phase. For this purpose, the DFT/B3LYP method, with the 6-311G basis set was utilized. The calculated value of the redox potentials relative to SHE were 0.123 eV, 0.015 eV and -0.254 eV for QO, MQO and AQO respectively. The amino derivative is (-0.76 eV) negative reduction potential because of amino group is more electron donating group comparison of methyl group. Energies of the highest occupied molecular orbital (HOMO) and the energy of the lowest unoccupied molecular orbital (LUMO) of the studied compounds were calculated in gas phase and water. Both electron donor and electron acceptor substituents are effective in reducing the energy gap between HOMO and LUMO. In addition, chemical potential (µ), chemical hardness (η), global electrophilicity (ω) and dipole moments were calculated. From the results shows that, quinoxalin-2-one, the greater is the tendency of the oxidized form to get reduced by accepting electrons and the amino derivative of quinoxalin-2-one is, the greater is the tendency of the reduced form to get oxidized by donating electrons.

Key words: Density functional theory, Redox potential, HOMO and LUMO, chemical potential (µ), chemical hardness (η) and global electrophilicity (ω).


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Abstract: The oxidation and reduction reactions of Cinnolin-4(1H)-one were studied in terms of reduction and oxidation potentials in aqueous phase. Geometry optimizations were performed at the 6-31++G (d, p) level by using the B3LYP functional theory. Cinnolin-4(1H)-one (I) has lower reduction potential (-0.184V) than that of 2,3-dihydrocinnolin-4(1H)-one (II) (-0.064 V). Oxidation potential of 2,3-dihydrocinnolin-4(1H)-one (II), has greater negative value (-0.134V) than oxidation potential of 1,2,3,4-tetrahydrocinnolin-4-ol (IV) (-0.091V). HOMO and LUMO energies are in increasing order: IV > II ≈ V > III > I and IV > II > V > I > III respectively, which is the same order as the strength of donating electrons in gas and aqueous phase. The values of µ, η, ω, and ΔNmax show, compound (III) is good electrophile comparison of the other compounds in gas and aqueous phase. Therefore compound (III); the greater is the tendency of the oxidized form to get reduced by accepting electrons.

Key words: Cinnolin-4(3H)-one, density functional theory, chemical potential (µ), chemical hardness (η), global electrophilicity (ω)

*Surendra Babu N.¹, Sisay Tadeasse¹, Lelisho T.A¹, and Nimmagadda Padmaja², 2014. Theoretical studies of stability, and local molecular properties of allopurinol isomers by density functional theory. IJPRS, 3(1): 557-565

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Abstract: Density functional theory (DFT) were used to determine the relative energies, electronegativity(χ), hardness (η), softness(S), electrophilicity index (ω) and local reactivity descriptors such as Fukui function, for the Allopurinol isomers (A1, A2, A3, A4, A5 and A6). For this purpose, the DFT/B3LYP method, with the 6-311++G (d,p) basis set was utilized. The local reactivity has been analyzed through the condensed Fukui function using natural population analysis (NPA). The most stable isomer is A5 and A1 has lowest energy, with relative energy about 5.97 kcal mol-1 and other four isomers (A2, A3, A4 and A6) have highest energy, with relative energy about 11.58-37.40 kcal mol-1. On the frontier orbital energy gap, the reactivity order of the isomers are A1 > A4 > A5 > A3 > A2 > A6 respectively. The preferred site for nucleophilic attack, and electrophilic in all isomers are N3, N8, N8, N3, O1 and N5, C2, N9, N9, N9, C9, and N6, for the isomers A1, A2, A3, A4, A5, and A6 respectively.

Key words: Allopurinol, DFT, HOMO-LUMO, Hardness, Softness, Fukui Function
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*Surendra Babu N1, 2014. Theoretical studies of the Vibrational spectra and Molecular electrostatic potentials (MEP) of Allopurinol isomers, Elixir Comp. Chem., 70: 24114-24117

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Abstract: The harmonic wave numbers of allopurinol were calculated by using of density functional theory with B3LYP/6-311++ G(d,p) level. The molecular electrostatic potentials (MEP) of allopurinol isomers were calculated with help of Spartan 10 software at the B3LYP/6-31++ (d,p) level, and the molecular surface was taken to be the 0.002 au contour of the electron density. These MEP map surfaces show that different colors, the red color shows positive potentials and blue color shows negative potentials. From the MEP results, the positive potentials sites are located an electronegative nitrogen and oxygen atoms and the negative potentials sites are located around the hydrogen atoms in the isomers. These potentials sites are mainly give the information about intermolecular interactions possible in the molecule.

Keywords: Allopurinol, Vibrational frequencies, DFT, Molecular electrostatic potentials (MEP).


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Abstract: A study on dye-sensitized solar cells (DSSCs) with extracts of Syzygium guineense as sensitizer is reported for the first time. DSSCs were assembled using natural dye extracted from Syzygium guineense as sensitizer. The photoelectrochemical performance of the quasi-solid state DSSCs based on the ethanol extract dye showed $V_{oc}$ of 0.506 V and $J_{sc}$ of 2.03 mAcm$^{-2}$; and a power conversion efficiency of 0.51%. UV–vis spectroscopy studies of light absorption of the natural dye were done. Furthermore, the ethanol extract obtained from Syzygium guineense was further purified stepwise through solvent-solvent extraction. The photoelectrochemical performance for the extracts with different solvents indicated that the individual components have synergistic effect in the performanceof the DSSC.


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Abstract: A solid-state photoelectrochemical solar energy conversion device based on blend of poly(3-hexylthiophene) (P3HT) and 1-(3-methoxycarbonyl)propyl-1-phenyl[6,6]C61 (PCBM), and an amorphous poly(ethylene oxide) complexed with I$^{3^-}$/I$^-$/ redox couple has been constructed and characterized. The photoelectrochemical performance parameters of the device were compared with pure P3HT and P3HT:C60 blend solid-state photoelectrochemical cell. The current density-voltage characteristics in the dark and under white light illumination and photocurrent spectra for front and backside illuminations have been studied. An open-circuit voltage of 140 mV and a short-circuit current density of 28.4 µA/cm$^2$ at light intensity of 100 mW/cm$^2$; IPCE% of 1.52% for front side illumination (ITO|PEDOT) and IPCE% of 0.17% for backside illumination (ITO|P3HT:PCBM) at a wavelength of 510 nm were obtained. The dependence of the short-circuit current density and an open-circuit voltage on the light intensity and time have also been studied.

Key words: Poly(3-hexylthiophene), PCBM, Amorphous poly(ethylene oxide), I3^-/I^- redox couple, Solidstate photoelectrochemical cell


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**Abstract:** A solid state solar energy conversion device based on nanocrystalline-TiO$_2$ sensitized with Di-tetrabutylammonium-cis-bis(isothiocyanato)bis(2,2’-bipyridyl-4,4’-dicarboxylato)-ruthenium(II) (N719) dye has been constructed and characterized. The current density-voltage characteristics in the dark and under white light illumination and action spectra under monochromatic illuminations have been studied. The following device parameters were obtained when the potential is scanned: an open circuit voltage of 762 mV and a short circuit current density of 33 µA cm$^{-2}$ at light intensity of 100 mW cm$^{-2}$; the IPCE percentage obtained was 1.7% at 330 nm. The dependence of the short circuit current density and open circuit voltage on the incident light intensity and illumination time have also been studied. The results of time dependence study show that the steady state $J_{SC}$ and $V_{OC}$ values are consistent with those obtained from the J-V curve.

**Key words:** I$_3^-$/I$^-$_redox couple, nanocrystalline-TiO$_2$, polymer electrolyte, solid state photoelectrochemical cell

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**Abstract:** Studies were conducted during the dry hot period of December 1999, to April 2000 in the Nechisar National park, Southern Ethiopia, to obtain base line data on catch, age compositions, and reproductive status of samples of *Glossina pallidipes*, trapped in NGU-2G traps. The objective was to assess tsetse population dynamics and to provide data on the temporal & spatial variations of the structures of the fly population at five localities (habitats). The Data were to be used for the suppression phase of a Sterile Insect Techniques (SIT) project in the study area. Population study in space was conducted at randomly selected five sites in and out of the park. In each vegetation type, a set of 2NGU-2G traps baited with urine and acetone were deployed for five days during the same week of the study time. Female flies were dissected to assess ovarian age structure of populations. To determine the age of male flies wing-fray analysis was carried out using wing-fray categories (1-6). Trapped tsetse included significantly higher proportions of teneral and non-teneral females, and a lower male: female ratio. Insemination rates of the samples of flies were over 95% at all habitats. In any one habitat, the frequency of pregnancy (egg stage) predominated, followed by the first, second, and lastly, by the third instar larva. Abortion of the predominant reproductive abnormality at all habitats of the natural population of *G.pallidipes*. Age composition of females (ovarian aging) showed greater proportion of females with 1-3 ovarian age categories and a physiological age between 8-40 days at all habitats. Age composition of males (wing-fray) were significantly greater for young males (1-3wfc) compared with old males (4-6wfc). The studies of this base line data collection with other operational studies will be a prerequisite to assess the feasibility of the proposed area wide eradication project and to develop appropriate strategies to suppress and finally to eradicate the fly by the situational releases of sterilized male flies.

**Key words/phrases:** Abortion, age reproductive status, Glossina palidipes, NGU-2G traps, Pregnancy


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Abstract: The ericaceous vegetation zone of the unique and highly fragmented afro-alpine environment in the eastern African high mountains is typically dominated by the heather Erica arborea, often in combination with its close relative E. trimera. Both species are shrubs or small trees with tiny seeds, potentially capable of dispersal by wind over long distances. While E. arborea is widely distributed in Africa, the Middle East and Europe, E. trimera is endemic to the afro-alpine region where it is restricted to higher altitudes than E. arborea. We used Amplified Fragment Length Polymorphisms (AFLPs) and variation in non-coding plastid DNA sequences to test whether these two morphologically and ecologically very similar species display similar phylogeographic patterns in the afro-alpine region. We predict that the more high-altitudinal E. trimera shows more distinct genetic structuring than E. arborea, because dispersal of the latter may have been facilitated by formation of interglacial forest bridges between mountains. Based on extensive field sampling in most of the high mountains of Ethiopia and East Africa, we show that the two species are clearly distinct at AFLP and plastid DNA loci. Both showed low levels of overall AFLP diversity, suggesting bottlenecks in small refugial populations during unfavourable climatic periods. However, their genetic structuring and inferred phylogeographic histories were conspicuously different. The more highaltitudinal E. trimera consisted of three to four distinct AFLP groups, which also had different plastid DNA haplotypes and different geographic distributions, suggesting long-term restriction to several refugia (at least one in Ethiopia and two in East Africa). In contrast, E. arborea showed little geographic structuring at AFLP loci and only a single, widespread plastid DNA haplotype, which may suggest recent colonization of the entire study area from a single source population, likely via a combination of gradual expansion via forest bridges and long-distance dispersals. The source population of E. arborea may be situated in (or north of) Ethiopia, which harbours most genetic diversity.

Key words: Tree heather, Afro-alpine, Pleistocene refugia, Montane forest bridge, Ethiopia


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Abstract: The study was undertaken to develop an efficient protocol for in vitro regeneration of shallot (Allium cepa). Two local shallot varieties (Huruta and Minjar) were used as experimental materials where basal discs were used as explants. Murashige and Skoog medium supplemented with different concentrations and combinations of 2, 4-Dichlorophenoxyacetic Acid, 6-Benzylaminopurine, Kinetin and α naphthaleneacetic acid were used for callus induction and regeneration of plantlet. Maximum callus induction was observed in genotype Huruta (81.11%) in medium supplemented with 1mg/l 2, 4- Dichlorophenoxyacetic Acid. In combined effect both genotypes Huruta and Minjar showed highest callus induction (74.44%) from basal discs placed in medium supplemented with 1mg/l 2,4- Dichlorophenoxyacetic Acid. Among the different types and combination of plant growth regulators, the maximum callus fresh weight of 1.26 and 1.20 g were achieved with 1 mg/l 2, 4- Dichlorophenoxyacetic Acid and α-naphthaleneacetic acid combined with 1 mg/l 6-Benzylaminopurine, respectively. Regenerated plants were obtained via somatic embryogenesis and organogenesis. Murashige and Skoog medium supplemented with 5.0 mg/l 6-Benzylaminopurine + 0.1 mg/l α-naphthaleneacetic acid showed higher percentage of shoot regeneration (91.11%). 1.5 mg/l indole-3-butyric acid + 2 mg/l 6-Benzylaminopurine was the optimum concentration giving 86.66% of rooted plantlets. The survival rate of transferred regenerated plantlets was satisfactory 66.6% and 60.0% for Minjar and Huruta respectively.

Key words: Callus, MS medium, plant regeneration, shallot, somatic embryogenesis

Claudiu Tudorancia¹, Zinabu Gebre-Mariam², Elias Dadebo², 1999. Limnology in Developing countries, Chapter3, International Association of Theoretical and Applied Limnology, 63 (118)

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Abstract: Ethiopia lies entirely within the tropics, but because most of its landscapes is a complex of plateaus and mountains reaching peaks as high as 4,620 m, its climate is variable due to high altitude. Similar to other eastern African countries, Ethiopia was in the past subject to dramatic tectonic movements
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(uplifting, faulting, volcanism, earthquakes). The plateau in the southern part of the country is bisected by the eastern African rift in one of the most extraordinary features of the earth’s crust. Ethiopian lakes display a wide range of physical, chemical and biological features and some are unique limnological sites which should be preserved. There has been a gradual, and more recently, a more rapid accumulation of limnological knowledge. This information and the expertise available locally can be used to enhance limnological knowledge by indigenous scientists working at two higher education institutions (Addis Ababa University and the Agricultural College of Awassa) and the governmental fisheries department. Cooperative ventures with institutions abroad must also be encouraged to add to knowledge and build up local expertise. The rapid population growth poses serious problems of water shortage and pollutional deterioration of available supplies. Conservation is urgently needed to stop or at least to slow these processes.

Key words: Crater lakes, East African Rift, Exotics, Fish introduction, Lake Tana, Reservoirs, Rift lakes, Water pollution

*Destá Z.¹, Borgstrøm R.², Gebremariam Z.¹, and Rosseland B.O.², 2008. Habitat use and trophic position determine mercury concentration in the straight fin barb Barbus paludinosus, a small fish species in Lake Awassa, Ethiopia, Journal of Fish Biology, 73(3): 477-497

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Abstract: The diet, habitat use and mercury concentration of the small fish species, the straight fin barb Barbus paludinosus, were studied in Lake Awassa, Ethiopia, for a period of 1 year from February 2003 to January 2004. Stable isotope signatures of nitrogen and carbon in different total length (Lₜ) classes were used to determine trophic positions and organic carbon sources, respectively. Barbus paludinosus mainly occupied the protected benthic habitats (littoral and profundal) of the lake. The δ¹³C values were in the range from −24 to −19‰, indicating that the carbon source for B. paludinosus was benthic, as well. Small individuals (≤ 60 mm Lₜ) mainly preyed upon ostracods, intermediate sizes (60–100 mm) on aquatic insects and gastropods, while a tiny cyprinodont fish Aplocheilichthys antinorii dominated the diet of large individuals (100–160 mm). The progressively increase in δ¹⁵N with increasing Lₜ also indicated a diet shift towards piscivory in larger individuals. The mercury concentration ranging from 0·02 to 0·74 mg kg⁻¹ wet mass (wm), was unexpectedly high in this small species, and was significantly positively related to Lₜ, as well as to δ¹⁵N. Some large individuals had mercury concentrations < 0·1 mg kg⁻¹ wm, and low δ¹⁵N, indicating substantial variations in diet between individuals of same size. The study suggests that other piscivorous species which include B. paludinosus in their diet may have a high mercury intake risk.

Keywords: Biomagnification, diet shifts, mercury, piscivory, stable isotopes

*Destá Z.¹², Borgstrøm R.¹, Rosseland B.O.¹ and Gebre-Mariam Z.², 2006. Major difference in mercury concentrations of the African big barb, Barbus intermedius (R.) due to shifts in trophic position, Ecology of Freshwater Fish, 15: 532-543

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Abstract: The African big barb (Barbus intermedius, R.) from Lake Awassa, Ethiopia is an important fish species, especially with the ongoing decline of the Nile tilapia (Oreochromis niloticus, L.) fishery. Their diet and habitat use was studied using stomach content analyses, stable nitrogen and carbon isotopes, and transect netting. Mercury biomagnification was also determined. The big barb was found to primarily exist in the littoral habitat, with molluscs being their predominant food item. The proportion of small fish (Barbus paludinosus, P.) in the big barb diet tended to vary somewhat with size, with the largest fish tending to have the most piscivorous diet. Mercury concentrations in the big barb ranged from 0.01 to 0.94 mg·kg⁻¹, and were positively related with size. Fish transects and stable isotope analyses suggest that there may be two feeding forms of big barb in Lake Awassa, with some larger fish preying upon fish (and accumulating higher
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mercury concentrations). With the declining Nile tilapia fishery in Lake Awassa, the implication of fishermen focusing on large big barb, with its associated higher Hg burdens, is significant with human health ramifications.

**Key words**: mercury; biomagnification; diet shifts; habitat use; piscivory; stable isotope analysis

*Edwin M. Foekema¹, Corine De Gruijter¹,², Mekuria T. Mergia¹,², Jan Andries van Franeker⁴, Alber Tinka J. Murk² and Albert A. Koelmans¹,³, 2013. Plastic in North Sea Fish. *Environ Sci Technol*, 47(15): 8818-24

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**Abstract**: To quantify the occurrence of ingested plastic in fish species caught at different geographical positions in the North Sea, and to test whether the fish condition is affected by ingestion of plastics, 1203 individual fish of seven common North Sea species were investigated: herring, gray gurnard, whiting, horse mackerel, haddock, Atlantic mackerel, and cod. Plastic particles were found in 2.6% of the examined fish and in five of the seven species. No plastics were found in gray gurnard and mackerel. In most cases, only one particle was found per fish, ranging in size from 0.04 to 4.8 mm. Only particles larger than 0.2 mm, being the diameter of the sieve used, were considered for the data analyses, resulting in a median particle size of 0.8 mm. The frequency of fish with plastic was significantly higher (5.4%) in the southern North Sea, than in the northern North Sea above 55°N (1.2%). The highest frequency (>33%) was found in cod from the English Channel. In addition, small fibers were initially detected in most of the samples, but their abundance sharply decreased when working under special clean air conditions. Therefore, these fibers were considered to be artifacts related to air born contamination and were excluded from the analyses. No relationship was found between the condition factor (size−weight relationship) of the fish and the presence of ingested plastic particles.


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**Abstract**: The present study investigates the likelihood that early life development of marine fish from contaminated areas is affected by maternally transferred persistent organic substances (POPs). The common sole (*Solea solea*) was used as model species. Fertilized eggs were exposed via the water until hatching 6 days postfertilization. Then newly hatched larvae were allowed to develop further under unexposed conditions until the end of the metamorphosis. Effects on the larvae were determined for the dioxin-like polychlorinated biphenyl PCB126, the technical PCB mixture Arochlor1254, polybrominated diphenylethers (PBDEs), and hexabromocyclododecane (HBCD), for an artificial mixture of PCBs and PBDEs, and for ‘field mixtures’ extracted from sole from the North Sea and the contaminated Western Scheldt estuary. Effect levels were expressed as tissue concentrations in the newly hatched larvae at the end of the exposure period. Exposure to PCBs, PBDEs, and the artificial and field mixtures caused mortality that started to occur shortly after the larvae became free-feeding (10 days postfertilization) and continued to increase until the onset of metamorphosis, 15 days later. The effects induced by the field mixtures correlated well with the ΣPCB concentrations in the tissue of the exposed larvae. No indications were found for synergistic effects or for substantial contribution of other (unknown) substances in the field mixtures. HBCD did not induce toxic effects. As lipid normalized POP levels in fish eggs are in general comparable to the...
levels in the tissue of the female fish, fish tissue concentrations are indicative of the internal exposure of the developing larvae as a result maternally transferred POPs will occur in the field. In sole from the Western Scheldt estuary POP levels are about twenty times lower than the larval tissue concentration that produced 50 percent early life stage mortality. Levels in North Sea sole are an order of a magnitude lower. At more heavily contaminated sites negative effect of PCBs, especially of those with dioxin-like toxicity can be expected.

Key words: Solea ELS, early life stage, Maternal transfer PCB, Brominated flame retardants, Critical body burden


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Abstract: The diet composition, ontogenetic dietary shifts and reproduction of the tigerfish Hydrocynus forskahlii (Cuvier, 1819) were studied from 386 fish samples (11.2 cm-69.6 cm total length, TL) collected from Lake Chamo from January to August 2005. From the total number of fish samples 231 (59.8%) that contained food in their stomachs were used in the analysis. Zooplankton occurred in 35.8% of the stomachs examined, accounted for 78.8% numerically and constituted 10.3% volumetrically. Insects occurred in 58.5% of the stomachs examined, constituted 20.8% of the total number of prey organisms and accounted for 38.7% of the total volume of the food items. Tilapia fry occurred in 43.4% of the stomachs examined, constituted 0.73% of the total number and 50.3% of the total volume of the prey. Macrophytes occurred in 18.9% of the stomachs and accounted for 0.74% of the total volume. H. forskahlii fed mainly on zooplankton when young and shifted to piscivorous feeding habit when it attained the size of about 25 cm TL. The sex ratio was significantly different from unity where 306 (79.3%) females and 80 (20.7%) males were caught during the sampling period. Relative fecundity of H. forskahlii ranged between 135 and 204, while mean fecundity ranged between 35,564 and 411,810. The relationships between fecundity (F) and TL (F = 0.0184TL4.08, r² = 0.61) and F and total weight (TW) (F = 36.89TW1.23, r² = 0.70) were curvilinear while the relationship between F and ovary weight (OW) (F = 4082.9OW 7949.5, r² = 0.88) was linear.

Key words: Diet composition, H. forskahlii, Lake Chamo, Reproduction


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Abstract: Food and feeding habits of T. zillii were studied from 572 fish samples collected from April to May 2011 (dry season) and July to August 2011 (wet season) from Lake Ziway. Stomach content analysis was conducted using frequency of occurrence and volumetric methods of analyses. Macrophytes, detritus and phytoplankton were the dominant food categories occurring in 94.9%, 94.2% and 82.5% of the total stomachs examined and constituting 45.2%, 29.4% and 16.8% of the total volume, respectively. The contributions of insects, nematodes, zooplankton and ostracods were relatively low. Macrophytes (50.4%), phytoplankton (21.8%) and detritus (18.5%) constituted the bulk of the food volume during the dry season. In the wet season detritus (40.8%), macrophytes (37.8%), phytoplankton (12.5%) and insects (6.5%) contributed the bulk of the food categories consumed. Phytoplankton, detritus and insects were important food categories of juveniles (5.0-9.9 cm TL) whereas macrophytes, detritus and phytoplankton were important food categories of adults. The importance of phytoplankton, detritus and insects declined with size of fish whereas the importance of macrophytes and nematodes increased with fish size. Based on the results
of the stomach contents it was concluded that the species is an herbivorous feeding mainly on macrophytes, detritus and phytoplankton. The contribution of animal origin food was low.

**Key words:** Diet composition, Feeding, Lake Ziway, T.Zillii


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**Abstract:** The food and feeding habits of the African big barb *Labeobarbus intermedius* (Rüppell, 1836) was studied based on 390 gut samples collected in April- May 2011 (dry months) and July- August 2011 (wet months) in Lake Koka, Ethiopia. Frequency of occurrence and volumetric methods of analysis were used in this study. Macrophytes, detritus and insects were the most important food items occurring in 79.1%, 80.0% and 62.5% of the guts, and accounting for 46.3%, 27.5% and 18.2% of the total volume of food, respectively. The contributions of phytoplankton, zooplankton, fish scales and ostracods were relatively low. Macrophytes and detritus were important food items during the wet months occurring in 96.2% and 60.9% of the guts, respectively and comprising 66.1% and 24.0% of the total volume of food items, respectively. The contribution of insects was low during the wet months. Detritus, macrophytes and insects were found to be the dominant food items in all size classes, whereas the contributions of ostracods, fish scales, zooplankton and phytoplankton were low. Based on the results it can be concluded that *L. intermedius* was omnivorous in its feeding habits in Lake Koka.

**Key words:** *L. intermedius*, feeding habits, Lake Koka, ontogenetic diet shift.


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**Abstract:** Some aspects of reproductive biology, length-weight relationship and condition factor of *Clarias gariepinus* (Burchell) were studied from January - December 1999 in an Ethiopian rift-valley lake (Lake Chamo). Except in some months and size classes, sex ratios didn’t differ significantly from 1:1, with season and size class. Males were more numerous than females in 20.0- 29.9 cm, 60.0-69.9 cm and >90 cm size classes (χ² = 4.50, p<0.05; χ² = 3.88, p<0.05; χ² = 16.00, P < 0.001, respectively). Significantly more males than females were also caught in January (χ² = 4.46, p<0.01), March (χ² = 10.79, p<0.01) and October (χ² = 10.45, p<0.01). *C. gariepinus* spawned over an extended period, and the main pulse in reproductive activity occurred during the rainy months of March - June. Length at first maturity (Lm50) of females was 58 cm while Lm50 of the males was 52 cm. Fecundity ranged from 5,000 -1,240,000 eggs with the mean at 337,700. Ripe ovaries contained 625 - 2,760 eggs g⁻¹ of wet weight with the mean of 1,110 eggs. The relationships between total length and fecundity, and total weight and fecundity were curvilinear while the relationship between ovary weight and fecundity was linear. Length-weight relationship for *C. gariepinus* is best expressed by the equation TW = 0.0035TL³.19. Mean monthly Clark’s condition factor of the females ranged from 0.274 ± 0.036 - 0.350 ± 0.030 while that of males ranged from 0.278 ± 0.02 - 0.343 ± 0.028.

**Key words:** *Clarias gariepinus*, Condition factor, Lake Chamo, Reproduction.


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Abstract: Synodontis schall (Bloch and Schneider) is an abundant fish in Lake Chamo, but its feeding ecology is not well-known to guide its management. Diet composition and ontogenetic diet shift were investigated from stomach contents of 545 fish from August 1998 to February 2000. Volumetrically, the dominant food items were zooplankton, fish scales and macrophytes. Zooplankton occurred in 83.3% of the stomachs and accounted for 26.5% of the total volume. Fish scales occurred in 35.0% of the stomachs and accounted for 30.6% of the total volume of food. Macrophytes occurred in 9.8% of the stomachs and contributed 8.3% of the total volume of food eaten. Insects occurred in 37.3% of the stomachs and constituted 10.9% of the total volume of food consumed. Diatoms, zooplankton and insects constituted 89.8% of the volume of food eaten by juveniles, but their importance declined with the size of fish. Importance of fish scales increased with size of fish. From these results, it is evident that zooplankton and insects were the most important food items of juveniles while fish scales, fish fry and macrophytes were the most important food items of adults. The information obtained from this study allows us to determine the effect Synodontis has on other organisms through competition and predation. This knowledge can be used in management of Synodontis fisheries by determining the prey type of the species and how the changing biological and physical conditions in the lake affect them.

Key words/phrases: Ethiopia, Feeding, Lake Chamo, Synodontis schall.


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Abstract: Diet composition and ontogenetic diet shift of the Nile perch, Lates niloticus (L.) were studied from 411 fish samples (1.9 cm to 192 cm TL) collected from February 1995 to May 1996. Most fish samples (n=221, 53.8%) had empty stomachs. Except the two smallest fry (1.9 cm and 2.3 cm TL) fish samples (n=188) that contained food in their stomachs consumed only fish. The cyprinid fish Labeo horie (Heckel) was the most important prey organism of juvenile and adult L. niloticus and occurred in 49.4% of the stomachs examined, constituted 38.02% of the total number and 70.44% of the total volume of the prey. Oreochromis niloticus (L.) occurred in 22.35% of the stomachs accounted for 19% of the total number and 24.82% of the total volume of food consumed. Hydrocynus forskahlii (Cuvier) occurred in 14.12% of the stomachs constituted 9.92% of the total number and 2.72% of the total volume of prey consumed. Cannibalism was observed in 19.4% of juvenile fish (n=62, 48.5–73.2 cm TL) and smaller L. niloticus constituted 26.1% of the total volume of food consumed within this size range. H. forskahlili, O. niloticus and L. niloticus were the main prey of fish <90 cm TL while L. horie was important prey of fish >90 cm TL. Based on index of relative importance (IRI) L. horie was the most important prey (5359) followed by O. niloticus (979), L. niloticus (392) and H. forskahlili (178.5). Fry and fingerlings of L. niloticus (n=20) ranging from 1.9 to 7.1 cm TL were caught using a beach seine of 6 mm mesh size. The two smallest fish (1.9 cm and 2.5 cm TL) had eaten insect larvae while the remaining 18 fish had all eaten 1–3 fry of O. niloticus that ranged from 0.8 to 1.9 cm TL.

Key words/phrases: Cannibalism, diet composition, Lates niloticus, ontogenetic diet shift, predation


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Abstract: The feeding habit of the African catfish Clarias gariepinus (Burchell) was studied by assessing the stomach contents of 419 fish (287 juveniles - 17.1-44.7 cm TL and 132 adults - 55.2-109.0 cm TL) collected between February 2003 and January 2004 in Lake Chamo. Different kinds of food items were found in the stomachs such as zooplankton, insects, fish scales, fish and detritus. Zooplankton occurred in 75.4% of the stomachs and accounted for 83.1% of the total volume of food consumed. Detritus occurred in 33.7% of the
stomachs and contributed 10.9% of the total volume of food items. Fish (O. niloticus) occurred in 15.5% of the stomachs and accounted for 4.2% of the total volume of the food organisms. Fish scales were found in 20.5% of the stomachs and contributed 1.2% of the total volume of food items. Insects occurred in 27.2% of the stomachs but their volumetric contribution was relatively low accounting for only 0.6% of the total volume. Generally juvenile fish tended to feed on relatively higher proportion of insects and detritus while adults tended to feed more on zooplankton.

Key words: Clarias gariepinus, Filter-feeding, Lake Chamo.


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Abstract: Some aspects of reproductive biology of Carassius carassius (L.) such as sex ratio, breeding season, size at first maturity and fecundity were studied from 539 fish samples collected from October 2003 to September 2004 in Lake Ziway, Ethiopia. The overall sex ratio (male: female) was 1.17 and deviated significantly from the hypothetical distribution of 1:1 (x2 =35.9, P< 0.001). Sex ratio was significantly different in all size classes >35.0 cm total length (TL) in November and December 2003 and in January, March and April 2004. The size at first maturity (Lm50) of males was 26.8 cm TL while Lm50 of females was 30.5 cm TL. C. carassius had an extended breeding period from December to June, with peak spawning in February for both sexes when 75.0% males and 71.4% females had ripe gonads. The main pulse in breeding activity occurred during the early rains. The total number of eggs in the ovaries ranged between 81,674- 10,616 with the mean number of 194,900 eggs female-1. Ripe ovaries contained 748-1,442 eggs g-1 of preserved wet weight with a mean number of 981. Fecundity was positively related to TL (R2 = 0.66, P<0.05) and total weight (TW) (R2 = 0.71, P< 0.05). C. carassius conformed to the general pattern of reproduction in a tropical environment where breeding activity started during the early rains. In order to protect the spawning population, fishing pressure should be minimized during breeding time at shallow littoral regions.

Key words: Breeding season, Commercial fishery, Fecundity, Introduced species, Size at first maturity.


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Abstract: Length-weight relationship, length at first maturity and sex ratio of the Nile perch Latesniloticus (L.) were studied from 342 fish samples collected between February 1995 and May 1996. The relationship between total length (TL) and total weight (TW) for both sexes was curvilinear and statistically significant. The regression equation for the males was TW=0.0044TL3.27 (r2=0.978, P<0.001) and that for the females was TW=0.0058TL3.2 (r2=0.991, P<0.001). 50% maturity size of males and females were found to be 88 cm and 106 cm TL respectively. The overall male to female sex ratio of 1: 0.64 was significantly different from the theoretical 1:1 ratio (OR=16.0, P<0.001). Generally males were more numerous at smaller size classes while females predominated at larger size classes. Forty-nine fish samples that ranged in length from 106.8 cm to 192 cm TL and in weight from 17,000 g to 108,000 g TW were used in fecundity estimates. The weight of ripe ovaries ranged from 325 g to 5,600 g with the mean weight of 934 g. Fecundity ranged between 1.24 million and 37.44 million eggs. The total and relative mean fecundity of L. niloticus was 6.35 million eggs female-1 and 162 eggs g-1 TW. The average number of eggs g-1 of ovary ranged from 6,200 to 9,300 with the mean number of 8,100. The relationships between fecundity and TL (F=0.0034TL4.32, n=49,
P< 0.01) and fecundity and TW (F=0.4357TW1.55, n=49, P< 0.01) were curvilinear while the relationship between fecundity and ovary weight (OW) (F=8.017OW–84,461, n=49, P< 0.01) was linear.

**Key words**: Fecundity, Lake Chamo, *Lates niloticus*, maturity, sex ratio


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**Abstract**: *Labeo horie* Heckel is increasingly becoming commercially important in Lake Chamo but its reproductive biology in the lake is not well enough to guide its management. Sex ratio, breeding season, length at first maturity and fecundity of *L. horie* were studied from 1197 fish samples collected between August 1998 and October 1999 in Lake Chamo, Ethiopia. The sex ratio was significantly different (χ² = 12.12, P< 0.001). The peak-breeding period was during the rainy months of March to May, during which time more than 90% of both sexes had ripe gonads. The size at maturity (\(L_{m50}\)) of males was 52 cm while the \(L_{m50}\) of females was 62 cm. The smallest ripe male in the catch was 46.7 cm and weighed 890 g while the smallest ripe female caught was 49.5 cm and weighed 1145 g. The weight of ripe ovaries ranged from 54.3 g to 991.8 g and contained between 68,400 and 1,320,400 eggs. Relative fecundity ranged between 60 and 290 eggs per g of body weight. The relationships between fecundity and total length and between fecundity and total weight were curvilinear, while the relationship between fecundity and ovary weight was linear. *L. horie* conformed to the general pattern of reproduction in a tropical environment where peak-breeding activity occurred during the rainy season. In order to protect the spawning population, fishing pressure should be minimized during breeding time at the shallower littoral regions.

**Key words**: *Labeo horie*, breeding, Lake Chamo, Ethiopia


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**Abstract**: The study on 10 lakes within the Ethiopian Rift Valley during March–May 1991 covered a range of conductivity (\(K_{25}\)) between 286 and 49100 µS cm\(^{-1}\). HCO\(_3\) \(\rightarrow\) CO\(_{3}\)\(^{2-}\) \(\rightarrow\) Na\(^+\) were the dominant ions in all the lakes. Concentrations of K\(^+\), Cl\(^-\) and SO\(_4\)\(^{2-}\) increased with increasing salinity and alkalinity, whereas Ca\(^{2+}\) and Mg\(^{2+}\) decreased. Comparison of these data with previous records showed that a ten-fold dilution of total ionic concentration occurred over 30 years in Lake Metahara and about three-fold increase occurred over 65 years in Lake Abijata. Concentrations of soluble silica were generally high (12–222 mg SiO\(_2\) \(^{-1}\)) and increased with increasing salinity, except for Lake Chamo which showed SiO\(_2\) depletion (to < 1 mg SiO\(_2\) \(^{-1}\)) over the past three decades. The relationship between ionic concentration and phosphorus was irregular although high phosphorus concentrations generally corresponded with increasing salinity. Fitting data to the Dillon & Rigler (1974) chlorophyll \(a\) — total phosphorus relationship suggested that lakes Zwai, Awassa and Chamo are phosphorus-limited, whereas others have surplus phosphorus.

**Key words**: alkalinity, Ethiopian lakes, nutrients, Rift Valley, salinity

Abstract: Dietary intake of fish containing organic contaminants poses a potential threat to human health. In the present work, an assessment has been carried out to look at the human health risk associated with consumption of fish contaminated with organochlorine pesticides (OCPs) and polychlorinated biphenyl (PCBs) in certain fish species collected from Lake Hawassa, Ethiopia. The health risk assessment was made by comparing the concentrations of OCPs and PCBs in fish muscle tissues with reference doses given in the USEPA guidelines. Dichlorodiphenyltrichloroethane (DDTs), endosulfans, PCBs and chloridanes were identified in fish species collected from Lake Hawassa. The most predominant pesticides were DDTs, with mean concentrations of RDDT ranging from 19 to 56 ng g⁻¹ wet weights. The highest concentrations of DDTs were found in Barbus intermedius, representing the highest trophic level. PCBs, DDT and endosulfan concentrations found in B. intermedius exceeded the reference dose for children between the ages of 0–1 year (with hazard index of above 1.0). Therefore, consumption of fish from a high trophic level (e.g. B. intermedius) from Lake Hawassa may pose a special health risk to children.

Key words: Fish consumption, Health risk, Lake Hawassa, Trophic position, DDT, PCB
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Abstract: The concentrations and bioaccumulation of persistent organic pollutants (POPs) were determined in four fish species from Lake Koka, Ethiopia, representing 2–3 levels in the food chain of the lake. Dichlorodiphenyltrichloroethanes (DDTs), endosulfans, polychlorinated biphenyls (PCBs) and chlorpyrifos were identified, with DDTs as the most predominant pesticide, with concentration ranging from 0.05 to 72.53 ng g−1 wet weight (ww). All fish tissue samples collected from different species of the lake contained residues of DDTs. The maximum level of DDTs was found in the fattiest, African sharptooth catfish (Clarias gariepinus) sampled from the lake, with a mean concentration of 15.15 ng g−1ww. The significant (Pb0.05) relationship between concentrations of DDTs and δ15N indicates that DDTs biomagnified in the food web of the lake. The 4,4′-DDE to 4,4′-DDT ratio in Oreochromis niloticus (0.6) and Cyprinus carpio (0.5) were below 1, indicating ongoing use of DDTs in the study area and recent exposure of these fish species.

Key words: Persistent organic pollutants, Biomagnification, Lake Koka, Fish species

Abstract: The concentration and accumulation of total mercury (THg) in relation to size, diet and trophic position of the fish have been investigated in three fish species, i.e., Barbus intermedius, Oreochromis niloticus and Clarias gariepinus, from Lake Koka and Lake Ziway, Ethiopia. Stomach content analysis and stable isotope ratios of nitrogen (δ15N, ‰) and carbon (δ13C, ‰) were used to determine the diet and the trophic position of the fish. The fish species studied represented different trophic positions in the food chain of the lakes. The THg concentrations in each of the three fish species, B. intermedius, C. gariepinus, and O. niloticus, ranged between non-detectable (ND) and 0.9 mg kg −1 (ww) in Lake Koka, and between ND and 0.5 mg kg −1 (ww) in Lake Ziway, respectively. Significantly a higher concentration of THg was found in B. intermedius than in C. gariepinus and O. niloticus, in Lake Koka, whereas in Lake Ziway, B. intermedius had significantly higher THg concentrations than O. niloticus only. Species variation in total THg accumulation is attributed to size, diet and trophic position of the fish.

Key Words: Fish species, Rift valley lakes, Trophic position, Hg

Abstract: The concentration and accumulation of total mercury (THg) in relation to size, diet and trophic position of the fish have been investigated in three fish species, i.e., Barbus intermedius, Oreochromis niloticus and Clarias gariepinus, from Lake Koka and Lake Ziway, Ethiopia. Stomach content analysis and stable isotope ratios of nitrogen (δ15N, ‰) and carbon (δ13C, ‰) were used to determine the diet and the trophic position of the fish. The fish species studied represented different trophic positions in the food chain of the lakes. The THg concentrations in each of the three fish species, B. intermedius, C. gariepinus, and O. niloticus, ranged between non-detectable (ND) and 0.9 mg kg −1 (ww) in Lake Koka, and between ND and 0.5 mg kg −1 (ww) in Lake Ziway, respectively. Significantly a higher concentration of THg was found in B. intermedius than in C. gariepinus and O. niloticus, in Lake Koka, whereas in Lake Ziway, B. intermedius had significantly higher THg concentrations than O. niloticus only. Species variation in total THg accumulation is attributed to size, diet and trophic position of the fish.

Key Words: Fish species, Rift valley lakes, Trophic position, Hg

*Ermias Deribe1, Alemayehu E. Masresha1, Peder August Gade1, Siri Berger1, Bjørn Olav Rosseland1, Reidar Borgstrøm2, Elias Dadebo1, Zinabu Gebremariam3, Ole Martin Eklo4, Lindis Skipperud1 and Brit Salbu1, 2014. Bioaccumulation of Mercury in Fish Species from the Ethiopian Rift Valley Lakes, International Journal of environmental Protection, 4(1): 15-22

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Abstract: We hypothesized that unusual deaths and illnesses in wild and domestic animals in lake areas of the Rift Valley south of Addis Ababa were caused by toxic cyanobacteria. In the first cyanotoxic analyses conducted in samples from Ethiopia, we found lakes Chamo, Abaya, Awassa, Chitu, Langoano, Ziway, and Koka all had concentrations of microcystins (MC) ranging from trace to hazardous, whereas only traces less than limits of detection (LOD) of cylindrospermopsin (CYN) were found. In the December 2006 dry season we sampled the lakes for analyses of MC, CYN, species structures, and calculations of cyanobacteria biomass. We used the Utermöhl technique to analyse cyanobacterial biomass and monitored MC toxins using HPLC-DAD, LC-ESI-MS-MRM, and ELISA-test and CYN with HPLC-DAD and ELISA. The various toxicity tests coincided well. In 4 of the lakes (Chamo, Langano, Ziway, and Koka), the inter-lake range of total MC concentration was 1.3–48 µg L−1; in 3 (Abaya, Awassa, and Chitu), we found only traces of MC. Microcystis aeruginosa was the dominant species, with Microcystis panniformis, Anabaena spiroides, and Cylindrospermopsis spp. as subdominants. The MC concentration, especially in Lake Koka, exceeded levels for serious health hazards for humans, cattle, and wildlife.

Key words: CyanoHAB, cylindrospermosin, ELISA, Ethiopian Rift Valley lakes, HPLC, mass spectrometry, microcystins, Microcystis

*Flipos Engdaw¹, Elias Dadebo² and Raja Nagappan¹, 2013. Morphometric relationships and feeding habits of Nile Tilapia Oreochromis niloticus (L.) (Pisces: Cichlidae) from Lake Koka, Ethiopia. International Journal of Fisheries and Aquatic Science, 2(4): 65-71

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Abstract: The study aimed to check morphometric relationships and feeding habits of the Nile tilapia Oreochromis niloticus (L.). A total 573 fish samples from 4.7 cm to 35.2 cm Total Length (TL) and from 1.67 g to 780.0 g Total Weights (TW) were collected from Lake Koka during dry (May) and wet (August) months of 2011. The relationship between TL and Standard Length (SL) was linear (SL = 0.8482TL-0.8674) and the relationship between TL and TW was curvilinear (TW = 0.0153TL3.0541). From the total number of fishes 488 (85.2%) stomach was observed with food and remaining 85(14.8%) was empty. The major food items found in the stomach content was phytoplankton, macrophytes and detritus. Phytoplankton occurred in 80.1% of the stomach contents examined and contributed 47.45% of the total volume of food items. Macrophytes and detritus was found in 61.1 and 75.2% of the stomach contents and contributed 26.2 and 15.5% of the total volume of the diet, respectively. Zooplankton and insects was recorded in 54.1 and 19.9% of the stomach and volumetrically accounted for 7.06 and 2.43% of the bulk, respectively. During the dry month phytoplankton was observed in 96.4% of the stomach and constituting 66.1% of the total volume of the diet. During wet month macrophytes was the most important food items found in 98.1% of the stomach contents and constituting 79.1% of the total volume of the food items. Ontogenetic dietary shift was observed during the present study. Small sized fish (<10 cm) fed mainly on insects and zooplankton. When the fish size increased phytoplankton, macrophytes was increased in their food contents and zooplankton, insects and ostracods declined.

Key words: Lake Koka, morphometric, Ontogenetic dietary shift, O.niloticus, Stomach contents


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Abstract: Fillets from the Nile tilapia (Oreochromis niloticus L.) were obtained from Lake Hawassa, and were exposed to ice storage in five different packages designated as package I (muscle to ice ratio of 1:1 (w/w)), package II (muscle to ice ratio of 1:2), package III (a combination of muscle, ice and water of 1:0.2:0.5 (w/w/w)), package IV (muscle to water ratio of 1:1) and package V (stored in a refrigerator at 40C). Clean fresh fillets contained 5.06 log (c.f.u/g). Fillets stored in ice crystals in the ratio of 1:2 (package
II) got spoiled after 24 hours, when the total bacterial count reached 5.31 log (c.f.u/g), while at the ratio of 1:1 (package I), the count reached 5.65 log (c.f.u/g). The fillets from these two packages were organoleptically acceptable for consumption up to the 24th hour of storage and those stored in water at the 1:1 ratio (package IV) were acceptable up to the 15th hour. At rejection, fish exhibited a strong fishy, sulfidy, putrid and ammoniacal odor. The respective counts of total lactics and psychrophiles initially were 1.70 and 4.27 log (c.f.u/g). However, after 24 hours of storage, they reached 2.89 and 5.32 log (c.f.u/g) in package II and 3.68 and 5.46 log (c.f.u/g) in package I, respectively. Our study revealed that the shelf-life of tilapia stored in ice was improved by about 12 hours.

Keywords/phrases: Fillets, Ice storage, Lake Hawassa, Oreochromis niloticus.


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Abstract: Seasonal variations in the biomass (Chl a) and primary production (14C-method) of phytoplankton were studied during 12 months of 2005 in the three Ethiopian Rift Valley Lakes (ERVL) Ziway, Awassa and Chamo. Chl a showed an average value of 40, 20, and 30mgm⁻³ for the three lakes, respectively. Integrated areal primary production for the total phytoplankton (gCm⁻² d⁻¹) varied 2-fold in the three lakes but on different levels, from 0.67–1.8 in L. Ziway, 1.8–4.6 in L. Awassa, and 1.0–2.6 in L. Chamo. The overall photosynthetic efficiency of utilizing photosynthetically active radiation by the phytoplankton on molar basis (mmol C mol of photons⁻¹) resulted in an average value of 1.4 for L. Ziway, 3.5 for L. Awassa and 1.6 for L. Chamo. Among the different factors regulating phytoplankton primary productivity, light penetration and nutrients were the most important in the three lakes. The seasonal variations of incident radiation (most values between 5 and 7Em⁻² h⁻¹) and water temperature (most values between 22 and 24°C) were small and unlikely to result in the marked differences in phytoplankton primary production. Although relative increase in nutrient concentrations occurred following the rainy periods, the major algal nutrients were either consistently low (nitrate and/or silicate) or high (phosphate and/or ammonium) and remained within a narrow range for most of the study period in all the three lakes. Consequently, phytoplankton biomass and primary production seem to be maintained more by nutrient regeneration or turnover (facilitated by high temperature) than by allochthonous nutrient input. This would be coupled with wind-induced mixing that would play an important role in determining hydrographic characteristics (water column structure) and the associated redistribution of nutrients and phytoplankton, the availability of light and subsequently the spatial (vertical) and temporal patterns of phytoplankton production in these three ERVL. Phytoplankton production (PP) is regarded as a good predictor of fish yield in lakes and seasonal measurements of PP is a prerequisite for good such estimates.

Keywords: Tropical lakes, Primary production, Chlorophyll, Physical data, Chemical data, Fish production


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Abstract: The fish Oreochromis niloticus, a species of great economic importance in Ethiopia, is common to almost all Ethiopian Rift Valley lakes (ERVL), but the fatty acid (FA) quantity and general food quality of the fish vary greatly among the lakes (ZENEBE et al. 1998a, 1998b). In the carnivorous fish, Clarias gariepinus, the FA variation between lakes was less pronounced. It has been shown that the quality of the basic food web has implications for the entire food web, including fish (FRASER et al. 1989, BRETT & MÜLLER-NAVARRA 1997, AHLGREN et al. 2005, BRETT et al. 2006). Scientific information on the basic food web, such as phytoplankton, in Ethiopian lakes has been sparse in the past. This gap has been greatly diminished in large part due to a recent seasonal study of phytoplankton composition and primary
production in three ERVL lakes: Awassa, Chamo and Ziway (GIRMA 2007). This Ph.D. study was carried out for 16 months during 2004–2005 in an Ethiopian- Swedish cooperation project. The present study of seston quality, measured as FA content, was performed within the above ERVL project. The aim was to compare the FA content of seston with that of zooplankton and earlier data of common fish species such as Oreochromis niloticus and Clarias gariepinus, assuming that the quality of the fish has not changed during the past 10 years. We hypothesize that the trophic transfer of important polyunsaturated fatty acid (PUFA) from the basic food web is more pronounced in zooplankton and in herbivorous fish than in carnivorous fish.

Key words: Ethiopian lakes, fatty acids, food quality, seston, zooplankton


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Abstract: Some aspects of reproductive biology, length-weight relationship and condition factor of 534 (258 males and 276 females) Bagrus docmak (Forsskål) in Lake Chamo were studied from samples taken during February 1995 to February 1996. B. docmak had an extended breeding period from February to August, with peak spawning in May for both sexes, when 76.2% males and 78.3% females had ripe gonads. The main pulse in breeding activity occurred during the rainy months of April and May. The overall sex ratio (male: female) was 1:1.07 which did not deviate significantly from the hypothetical distribution of 1:1 (x2 = 0.61, p>0.05). However, sex ratio was significantly different from 1:1 in the samples >90 cm fork length (FL) (x2 = 10.71, p<0.001). Size (FL) of first maturity was 62.0 cm for males and 69.0 cm for females. The mean number of eggs per female was 276,500. Ripe ovaries contained 990–2,100 eggs per gram of preserved wet weight with a mean number of 1,475. Fecundity was positively related to FL (r2 = 0.75, p<0.05), total weight (TW) (r2 = 0.73, p<0.05) and ovary weight (OW) (r2 = 0.90, p<0.05). Length-weight relationship of B. docmak is best expressed by the equation TW= 0.0054 FL3.24. Monthly Clark’s condition factor (mean +/- SE) ranged from 0.426± 0.011 to 0.489± 0.014 for males and from 0.449± 0.010 to 0.489± 0.012 for females.

Key words/phrases: Breeding season, condition factor, fecundity, size at first maturity


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Abstract: The Ethiopian Rift Valley Lakes host populations of edible fish species including Oreochromis niloticus, Labeobarbus intermedius and Clarias gariepinus, which are harvested also in other tropical countries. We investigated the occurrence of six heavy metals in tissues of these fish species as well as in the waters of Lake Koka and Lake Awassa. Both lakes are affected by industrial effluents in their catchments, making them ideal study sites. Mercury concentrations were very low in the water samples, but
Concentrations in the fish samples were relatively high, suggesting a particularly high bioaccumulation tendency as compared with the other investigated metals. Mercury was preferentially accumulated in the fish liver or muscle. It was the only metal with species-specific accumulation with highest levels found in the predatory species *L. intermedius*. Lower mercury concentrations in *O. niloticus* could be attributed to the lower trophic level, whereas mercury values in the predatory *C. gariepinus* were unexpectedly low. This probably relates to the high growth rate of this species resulting in biodilution of mercury. Accumulation of lead, selenium, chromium, arsenic and cadmium did not differ between species, indicating that these elements are not biomagnified in the food chain. Values of cadmium, selenium and arsenic were highest in fish livers, while lead and chromium levels were highest in the gills, which could be related to the uptake pathway. A significant impact of the industrial discharges on the occurrence of metals in the lakes could not be detected, and the respective concentrations in fish do not pose a public health hazard.

**Key words:** Ethiopian rift valley lakes, Heavy metals, Bioaccumulation, Fish organs, Inland fisheries, Food safety


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**Abstract**: A cross sectional survey was conducted to assess the prevalence rate of intestinal parasites with emphasis on hookworm infection on apparently healthy 421 elementary school children of Boloso Sorie woreda, Wolaita zone, Southern region. The prevalence of intestinal parasite among the studied children was found to be 69.4%, of *Ascaris lumbricoides* dominating (40.0%) followed by hookworm (26.8%). Low level of hemoglobin was not significantly associated with hookworm infection. The overall prevalence of anemic condition (below normal level of hemoglobin) was found to be 20.6%. Promotion of appropriate solid and liquid waste disposal, supply of safe water and feet wearing are recommended.


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**Abstract**: The Ethiopian Rift Valley Lakes (ERVLs) are water resources which have considerable environmental, economic and cultural importance. However, there is an increasing concern that increasing human activities around these lakes and their main inflows can result in increased contamination of these water bodies. Information on total concentrations of some trace elements is available for these lakes and their inflows; however, data on the trace element speciation is lacking. Therefore, the objective of this study was to determine the low molecular mass (LMM) trace element species and also, evaluate the influence of flooding episodes on the LMM trace element fractions. At-site size and charge fractionation system was used for sampling of water from the lakes Koka, Ziway and Awassa and their main inflows during the dry and wet seasons. The results showed that chromium (Cr), manganese (Mn), cobalt (Co), nickel (Ni), copper (Cu), zinc (Zn), and lead (Pb) in Lake Koka and its inflows as well as in Lake Ziway were predominantly present as HMM (high molecular mass, i.e., >10 kDa) forms, while arsenic (As), selenium (Se), cadmium (Cd) were more mobile during the dry season. In Lake Awassa, all except Cr and Mn were predominantly found as LMM species (low molecular mass, i.e. <10 kDa) which can be attributed to the high concentrations of LMM DOC (dissolved organic carbon). During the wet season, results from the Lake Koka and its inflows showed that all trace elements were predominantly associated with HMM forms such as colloids and particles, demonstrating that the mobility of elements was reduced during the wet season. The colloidal fraction of elements such as Cr, Ni, and Cd was also correlated with dissolved Fe. As the concentration of LMM trace element species are very low, the mobility, biological uptake and the potential environmental impact should be low.

**Key words**: Trace element, *At-site* fractionation, Ethiopian Rift Valley Lakes, Inflows, Dry season, wet season, Environmental impact

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**Abstract:** A study was carried out from November 2010 to June 2011 in Hawassa University Referral Teaching Hospital to identify bacterial species involved in post-operative wound infections and to determine their antimicrobial resistance pattern. The study involves 100 surgical patients with post-surgical wound infections. Swab samples of wound discharge were collected for bacteriological examination and inoculated on appropriate culture media. Isolates were identified and characterized by standard methods and antibiotic resistance was determined using the Kirby-Bauer disk diffusion method. A total of 177 bacterial isolates were identified in the study. The most dominant isolates were *Staphylococcus aureus*, *Klebsiella* spp., *Escherichia coli* and coagulase negative staphylococci (CoNS) accounting for 45 (25.4%), 32 (18.1%), 30 (16.9%) and 26 (14.7%) of the isolates respectively. Other bacteria isolated include *Pseudomonas aeruginosa* (9.0%), *Proteus* spp. (6.8%), *Streptococci* (5.1%), *Citrobacter* spp. (2.3%) and *Enterobacter* spp. (1.7%). Of the 177 isolates, 173 (97.7%) were resistant to at least 1 antimicrobial, while 164 (92.7%) were resistant to ≥2 antimicrobials. Resistance of isolated organisms was 76.3% to amoxicillin, 71.2% to penicillin, 56.9% to vancomycin, 39.5% to ceftriaxone and norfloxacin and 31.1% to gentamicin. The susceptibility of *S. aureus* was 64.4% to gentamicin but it was 100% resistant to amoxicillin. All isolates of *P. aeruginosa* were resistant to penicillin and amoxicillin. The rate of resistance of *S. aureus* to 2 or more antimicrobials was 97.8% and that of *P. aeruginosa* was 100%. This study confirms that the bacteria commonly implicated in post-operative wound infections: *S. aureus, Klebsiella, E. coli*, CoNS, and *P. aeruginosa*, continued to dominate and have developed high level of drug resistance to some important antibiotics. Periodic surveillance of the species of bacteria involved in post-operative wound infection and determination of their antimicrobial resistance is recommended for empirical treatment.

**Key words:** Antimicrobial resistance, post-operative, surgical, wound infection, Ethiopia, Hawassa


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**Abstract:** Lobelia giberroa is a giant rosette plant growing in the afro-montane belt of the afro-alpine environment, a unique and little-studied ecosystem occupying the high mountains of eastern Africa. We analysed amplified fragment length polymorphisms (AFLPs) from 11 mountain systems in Ethiopia and Tropical East Africa to infer the phylogeographical history of the species. A total of 191 individuals were investigated from 25 populations. Principal coordinate analysis and population structure analyses revealed three major phylogeographical groups: the Ethiopian mountain groups and one group on each side of the Rift Valley in Tropical East Africa, respectively: Elgon-Cherangani and Kenya-Aberdare-Kilimanjaro-Meru. Analysis of Molecular Variance showed 55.7% variance among the three groups, suggesting an old divergence. Together with a clear geographical substructure within the main groups, this pattern indicates gradual expansion and supports the montane forest bridge hypothesis, stating that the area occupied by forest was larger and more continuous in previous interglacials and earlier in the present interglacial. Genetic diversity was lower in Ethiopia than in the other two main groups, possibly due to an ancient founder effect when Ethiopia was colonized from the south.

**Key words:** AFLP, afro-alpine, afro-montane, conservation, dispersal, *Lobelia giberroa*, phylogeography


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Abstract: A cross sectional survey was conducted to assess the sanitary status and hygienic practices of catering business establishments in Awassa town, southern Ethiopia, February to April 1996. Data were collected using standardized questionnaires, free listings, parasitological and bacteriological laboratory analysis. A total of 164 catering establishments were identified and investigated. They had about 1023 workers with daily customer services of about 14,965. Water was found to be available in most (89.7%) of the establishments and sanitation coverage (defined as the presence of latrine) was 98.0%. The overall prevalence of intestinal parasites among food handlers was 63.0%, with Gardia lambilia (33.3%), Entamoeb histolytica (21.5%), Ascaris lumbricoides (18.2%) and hookworm species (10.8%). The water supply and sewerage authority (WSSA) water supply was found to bacteriologically potable. Inadequate follow-up of catering establishments, absence of optimum standard procedures and guidelines for business operation, poor regular refurbishment practice, inappropriate liquid and solid waste disposal system, and poor personal hygiene of food handlers were major findings. Multi-lateral and inter-sectoral collaboration and cooperation is mandatory to design the rapidly growing urbanization and industrialization of the town by involving municipalities, the local administrative council, the health sector, owners of the establishment and the community to work together and comply with the optimum standards and procedures. Recommendations are forwarded to ensure customers expectations, needs, and demands.


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Abstract: Background: As is the case with other developing countries of the world, child labor is also a problem in Ethiopia. However, there is shortage of data concerning the working and living conditions of child laborers in Ethiopia, and their problems in the various administrative regions of the country. Objective: To assess the reasons for the exploitation of child labor, and the nature and magnitude of problems encountered by child laborers. Method: Both quantitative and qualitative methods were employed in three purposely selected three towns (Awassa, Wolaita Sodo, and Arbaminch) in SNNPR from February to May 2003. Result: A total of 323 child laborers participated in the survey. About 42.0% of children were below the age of 14 years and were engaged in employed labor. None of the child laborers interviewed was at school during the study period. The reasons for child labor included poverty (60.7%), loss of parents (17.3%), disagreement with parents (8.4%), parental separation (6.5%), shortage of food (5.3%) and displacement due to war (1.5%). Almost all of the respondents’ parents had a low level rank occupation with 64.0% having a monthly income of less than 50 birr and 79.0% of the respondents reported that they were from poor families. Among the respondents, 51.1% were domestic child laborers, 22.6% were street child laborers and 18.3% were working in private organizations. Two-thirds of the child laborers were working for more than 10 hours a day and 82.0% of them had a daily income of less than five birr. About half of them stayed in the job for more than two years and most of them did not visit their parents or relatives for long periods of time. Eighty-four percent of them reported previously encountering one or more health problems. Malaria-like illnesses and diarrhoeal diseases were the major health problems reported. About 19.0% of them were sexually active, yet 22.6% of them have never heard about HIV/AIDS. About three-quarters of them did not attend any kind of health education program. The majority (77.4%) of them had never heard of the Conventions on the Rights of the Child (CRC). Conclusion: The study indicated that child laborers are denied the liberating benefit of education; their health, growth and development are threatened; and that they have lost the love and affection, care and protection of their families; and could not enjoy the rest and recreation that are the rights of every child.


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Abstract: The acute toxicity of fenitrothion (FNT) alone and combined with piperonyl butoxide (PBO) or triphenyl phosphate (TPP), and their effect on liver esterase (LE) activity of Gambusia affinis, Pseodorasobora parva and Oncorhynchus mykiss was studied in aquaria for 96h. The results indicated that fenitrothion is moderately toxic to the three species of fish tested, the toxicity being highest to O. mykiss
followed by *P.parva* and *G.affinis*. Both FNT concentrations and the exposure time on the activity of LE and FNT (two way ANOVA *P*<0.05) caused more inhibition in *G.affinis* than *P.parva*. Pretreating fish with either PBO or TPP changed the acute toxicity level and LE sensitivity compared with those exposed to FNT alone. The acute toxicity level and susceptibility of LE to FNT was found to be inversely related. With additional studies *P.parva* and *G.affinis* has potential to be used as bioindicator, and LE as biochemical biomarker of environmental pollution by FNT and other related compounds.

**Key words/phrases:** Fenitrothion, Fish, Liver esterase, Synergists, Toxicity


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**Abstract:** Background: the number of street children and women in major owns of Ethiopia is rapidly increasing. Yet their problems have not been fully studied. Objectives: To assess health and related problems in street children and women. Methods: A cross sectional survey was conducted in Awassa town, southern Ethiopia in December 1999. Data was collected using a uniform questionnaire. The respondents were interviewed by trained health workers in purposively selected nine data collection sites for one week. The data was processed using Epi Info version 6 statistical package computer software. Results: A total of 506 street children and women participated in the study. A considerable proportion (63.0%) of respondents had daily income of less than four birr, all women being included in this category of income, and 15.0% of them had an income of less than two birr. Two hundred forty one (47.6%) of the respondents reported that they have had meals as available. Two hundred forty one (58.0%) of the children were homeless. Two hundred eighty (55.3%) of the street children reported one or more previous health problems. Malaria-like febrile illnesses (42.6%) followed by respiratory tract illnesses (33.1%) and diarrhoeal diseases (4.5%) were the major health problems reported. The majority of them attended government health care facilities to the reported health problems. About half of the children reported that they used one or more of the habit-forming substances (alcoholic drinks, chat and cigarette). Among street children above 15 years old and women, only 22.8% used family planning and prevention methods for sexually transmitted diseases (STDs). The majority (55.7%) of street children and women did not know the transmission route of STDs and HIV. A large proportion (64.5%) of street children did not attend any kind of health education programs. Their personal hygiene was found to be very poor Conclusion: Improving acess to existing health care facilities, providing them with health education and looking for possibilities to reunite the street children with their families are recommended.

*Solomon Sorsa*¹, Li Shaonan¹ and Fan Defang¹, 2000. In vivo inhibition and recovery of brain acetylcholinesterase in topmouth gudgeon (*P. parva*) following exposure to fenitrothion, *Journal of Zhejiang University (Science)*, 1(4): 448-455

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**Abstract:** Freshwater fish, topmouth gudgeon (*Pseudorasobora parva*), were pretreated with piperonyl butoxide (PBO) or triphenyl phosphate (TPP) and then exposed to different concentrations of fenitrothion (FNT) in a static system. Evaluation of brain acetylcholinesterase (AchE) activity after 2, 48 and 96h pesticide exposure indicated that AchE activity decreased as th concentration increased. Fish pretreated with TPP exhibited significantly decreased AchE activity while in the PBO pretreated group, increased activity was observed compared with those exposed to FNT alone. The pattern of AchE recovery also assessed in fish previously exposed for 96h and then transferred to clean (chemical free) water. Following 8 days of recovery period, the AchE activity of those exposed to FNT alone and pretreated with TOO was still lower than that of the control. This study showed that FNT may cause hazard to fish after field application.

**Key words:** Acetylcholinesterase, fenitrothion, fish, inhibition, recovery

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*Solomon Sorsa1, Fan Defang1 and Li Shaonan1, 1999. Hepatic glutathione S-transferase activity in mosquitofish (Gambusia affinis) and topmouth gudgeon (P. parva) exposed to fenitrothion, Journal of Zhejiang University (Science), 1(2): 190-195

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Abstract: Two common fish species mosquitofish (Gambusia affinis) and topmouth gudgeon (P. parva) were exposed different concentrations of fenitrothion (FNT) in a static system for 96h. Hepatic glutathione S-transferase (GST) activity was evaluated after 48 and 96h pesticide exposure, and was also examined in fish pretreated with piperonyl butoxide (PBO) or triphenyl phosphate (TPP) and then exposed to FNT. Results indicated presence of intense glutathione S-transferase activity in both species, mosquitofish exhibiting the higher activity. In both species the activity decreased as the concentration of FNT increased, topmouth gudgeon being more susceptible than mosquitofish. In mosquitofish pretreated with PBO, glutathione S-transferase activity was increased (11.8) compared with the control but in topmouth gudgeon was decreased (21.6%) at the end of 96h. Glutathione S-transferase activity was significantly reduced in both species pretreated with TPP at the end of 96h exposure, topmouth gudgeon being highly susceptible.

Key words: Fenitrothion, hepatic GST activity, glutathione S-transferase, fish

*Solomon Sorsa1, Li Shaonan1, and Fan Defang1, 1999. Brain acetylcholinesterase response and recovery in mosquitofish (Gambusia affinis) exposed to fenitrothion, Chinese Journal of Pesticide Science, 1(2): 61-72

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Abstract: Mosquitofish (Gambusia affinis) were exposed to fenitrothion (FNT) in a static system for 96h. Brain acetylcholinesterase (AchE) activity was evaluated after 24, 48 and 96h insecticide exposure. Fish were also pretreated with piperonyl butoxide (PBO) or triphenyl phosphate (TPP) and then exposed to FNT. Results indicated that FNT produced significant inhibitory effect on AchE ranging from 14.2% to 65.7% at the sublethal concentrations of 0.4, and 1.3 mg/l. Fish pretreated with TPP exhibited decreased AchE activity whilst in PBO pretreated group increased activity was observed compared with those exposed to FNT alone. The pattern of AchE recovery was also assessed in fish previously exposed for 96h and then transferred to clean water. Following 8 days of recovery period, the AchE activity of those exposed to FNT alone and pretreated with TPP was still lower than that of the control.

Key words: Acetylcholinesterase, fenitrothion, fish, Inhibition, recovery

*Tamirat A. Belay1,2, Totland Ø1, and S.R. Moe1, 2012. Woody vegetation dynamics in the rangelands of lower Omo region, southwestern Ethiopia, Journal of Arid Environments, 89: 94-102

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Abstract: Woody encroachment is one of the several factors aggravating rangeland degradation in arid and semiarid areas. The goal of this study is to improve our understanding about the relationship between woody encroachment and its potential drivers by analyzing the temporal and spatial pattern of landcover changes in the lower Omo region of southern Ethiopia. We used a combination of multitemporal images, as well as climatic and demographic data for the analysis. Between 1985 and 2010 woody vegetation cover increased by 30.6% in the pastoral landuse type, while declining by 4.4% in the semipastoral areas. The increment was negatively associated with altitude and browser livestock density. However, contrary to the traditional presumption, it was not associated with grazer livestock density. Moreover, woody encroachment was higher in remote sites, farther from rivers and towns, where there is relatively lower human activities and livestock disturbance. The finding suggests the ecological significance of landuse type and livestock browsing to regulate the dynamics of woody vegetation in disturbance-adapted rangelands. Thus, a careful introduction
of native larger browsers into woody encroached pastoral areas may help to facilitate rapid ecosystem recovery.

**Key words**: Animal mobility, Arid and semiarid rangeland, Bush encroachment, Image classification, Non equilibrium, Rainfall variability


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**Abstract**: Self-thinning has been considered an important mechanism facilitating species coexistence in nature. The purpose of this study was to examine the role of self-thinning in regulating the density of woody plants in semi-arid savannas. Previous models (e.g. the ‘honeycomb rippling model’) have postulated that, as trees grow older (inferred by size), the interplant distance, taken to reflect competition-induced mortality, becomes greater and more even. Therefore, the opening of canopies in the long-run promotes species coexistence. To study the role of self-thinning in a semi-arid savanna we selected four savannah patches and sampled the plant density, size, and distance between the tallest woody plant and its nearest conspecific and heterospecific neighbors, along with other environmental variables. Interplant distance was positively influenced by species, tree size, woody species diversity, and nearest neighbor type (conspecific vs. heterospecific). Distances did not increase evenly with increasing size of the tallest tree or shrub, however. We conclude that self-thinning is evident in woody encroached semi-arid savannah patches, as suggested by the honeycomb rippling model. The mechanism may play a significant role for the long-term stability of the savanna by opening dense canopies and facilitating treegrass coexistence.

**Keywords**: Lower Omo, Ethiopia, Semiarid savanna, Intra-specific competition, Inter-specific competition, Woody encroachment

*Tamrat A. Belay¹², Ørjan Totland¹, Stein R. Moe¹, 2013. Ecosystem responses to woody plant encroachment in a semiarid savanna rangeland, Plant Ecol., 214(10): 1211-1222

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**Abstract**: Woody plant encroachment alters the structure and function of rangeland ecosystems. The objective of this study was to explore the association between woody plant encroachment and various ecosystem properties (i.e. vascular plant species diversity, richness, evenness, soil organic matter, herbaceous biomass, leaf litter and bare ground cover) in a semiarid savanna rangeland, and also to test whether the relationships were influenced by woody species composition, elevation and site. We carried out a vegetation survey in four rangeland sites in the lower Omo region of southwestern Ethiopia, and regressed each one of the ecosystem properties, separately, against woody plant density, elevation and site using multiple linear regressions. We found that vascular plant species diversity, richness and evenness increased with woody plant density, most likely due to increased spatial heterogeneity and soil microclimate improvement. Bare ground cover increased significantly, whereas herbaceous biomass and soil organic matter did not respond to woody encroachment. In a subsequent investigation, we used a redundancy analysis to assess whether ecosystem properties were influenced by the identity of encroaching woody plant species. Species diversity and richness responded positively to *Lannea triphylla*, whereas leaf litter responded positively to *Grewia tenax* and *G. villosa*. Our findings suggest that woody plant encroachment in a semiarid rangeland does alter ecosystem properties. However, its impact is highly variable, influenced by a set of factors including the level of encroachment and identity of encroaching woody species.

**Keywords**: Bush Encroachment, Ecosystem Properties, Community Structure and Function, Animal Production, Biodiversity, Lower Omo Region
Academic Success Depends on Research and Publications


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Abstract: Laboratory experiments with stable isotopes (13C and 15N) were conducted to determine the importance of bacteria and algae as food sources for free-living nematodes. All tested bacterivorous nematodes (*Caenorhabditis elegans*, *Acrobeloides tricornis*, *Poikilolaimus* sp. and *Panagrolaimus* sp.) were found to be depleted in δ13C (on average by −1.71 ± 0.56) and enriched in δ15N (on average by 3.17 ± 1.27) relative to their bacterial diets of *Escherichia coli* and *Matsuebacter* sp. The nematode species showed considerable differences in their stable isotope composition with respect to food sources. Moreover, they differed significantly in δ13C and δ15N values when placed on the same bacterial diet of *E. coli*, consistent with differences in their trophic shifts. Conversely, no differences in δ13C values were observed among nematode species placed on the same *Matsuebacter* sp. diet. In mixed food sources of *E. coli* and *Matsuebacter* sp., *E. coli* contributed 71% of the carbon to *C. elegans* and *Matsuebacter* sp. more than 90% of the carbon to *A. tricornis*. An enrichment experiment based on 13C-enriched NaH13CO3, 13C6-glucose and 15N-enriched Na15NO3 tracers in a freshwater periphytic community showed the importance of microalgae and diatoms over heterotrophic bacteria as the main food sources of free-living periphytic nematodes. In this respect, direct grazing may predominate, possibly together with the use of extracellular polymeric substances (EPS) from diatoms. In general, the use of stable isotopes to study nematode feeding ecology can be useful to investigate directly the type of ingested food item(s), different bacteria and algae, and the contribution to nematode diet, in addition to the conventional feeding type scheme.

Key words: δ13C, δ15N, *Caenorhabditis elegans*, nematode diet, periphyton, tracers, trophic shift.

*Tulu Degefu¹, Endalkachew Wolde-meskel² and Ása Frostegård¹, 2013. Phylogenetic diversity of Rhizobium strains nodulating diverse legume species growing in Ethiopia, *Systematic and Applied Microbiology*, 36: 272-280

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Abstract: The taxonomic diversity of thirty-seven Rhizobium strains, isolated from nodules of leguminous trees and herbs growing in Ethiopia, was studied using multilocus sequence analyses (MLSA) of six core and two symbiosis-related genes. Phylogenetic analysis based on the 16S rRNA gene grouped them into five clusters related to nine Rhizobium reference species (99–100% sequence similarity). In addition, two test strains occupied their own independent branches on the phylogenetic tree (AC86a2 along with *R. tibeticum*; 99.1% similarity and AC100b along with *R. multihospitium*; 99.5% similarity). One strain from *Milletia ferruginea* was closely related (>99%) to the genus Shinella, further corroborating earlier findings that nitrogen-fixing bacteria are distributed among phylogenetically unrelated taxa. Sequence analyses of five housekeeping genes also separated the strains into five well-supported clusters, three of which grouped with previously studied Ethiopian common bean rhizobia. Three of the five clusters could potentially be described into new species. Based on the *nifH* genes, most of the test strains from crop legumes were closely related to several strains of Ethiopian common bean rhizobia and other symbionts of bean plants (*R. etli* and *R. gallicum* sv. *phaseoli*). The grouping of the test strains based on the symbiosis-related genes was not in agreement with the housekeeping genes, signifying differences in their evolutionary history. Our earlier studies revealing a large diversity of Mesorhizobium and Ensifer microsymbionts isolated from Ethiopian legumes, together with the results from the present analysis of Rhizobium strains, suggest that this region might be a potential hotspot for rhizobial biodiversity.

Key words: MLSA, Genospecies, Rhizobium, Symbiosis-related genes
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**Abstract**: A total of 18 strains, representing members of the genus *Mesorhizobium*, obtained from root nodules of woody legumes growing in Ethiopia, have been previously shown, by multilocus sequence analysis (MLSA) of five housekeeping genes, to form three novel genospecies. In the present study, the phylogenetic relationship between representative strains of these three genospecies and the type strains of their closest phylogenetic neighbours *Mesorhizobium plurifarium*, *Mesorhizobium amorphae*, *Mesorhizobium septentrionale* and *Mesorhizobium huakui* was further evaluated using a polyphasic taxonomic approach. In line with our earlier MLSA of other housekeeping genes, the phylogenetic trees derived from the atpD and glnII genes grouped the test strains into three well-supported, distinct lineages that exclude all defined species of the genus *Mesorhizobium*. The DNA–DNA relatedness between the representative strains of genospecies I–III and the type strains of their closest phylogenetic neighbours was low (<59 %). They differed from each other and from their closest phylogenetic neighbours by the presence/absence of several fatty acids, or by large differences in the relative amounts of particular fatty acids. While showing distinctive features, they were generally able to utilize a wide range of substrates as sole carbon and nitrogen sources. The strains belonging to genospecies I, II and III therefore represent novel species for which we propose the names *Mesorhizobium shonense* sp. nov., *Mesorhizobium hawassense* sp. nov. and *Mesorhizobium abyssinicae* sp. nov. The isolates AC39aT (5LMG 26966THAMBI 3295T), AC99bT (5LMG 269685HAMBI 3301T) and AC98cT (5LMG 269675HAMBI 3306T) are proposed as type strains for the respective novel species.


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**Abstract**: The diversity of 71 rhizobial strains belonging to the genus *Ensifer*, isolated from root nodules of woody legumes growing in southern Ethiopia, was studied using multilocus sequence analysis (MLSA) and phenotypic approaches. Phylogenetic analyses based on core genes revealed that 43 strains were clustered in seven distinct and consistent positions (genospecies I–VII), while another 25 strains were also distinct but were discrepant in their placement on the different gene trees. The remaining three strains occupied the same phylogenetic branches as defined *Ensifer* species and thus were not distinct. Irrespective of their chromosomal background, the majority of the test strains were highly related with respect to their nifH and nodC gene sequences, suggesting that these symbionts might have acquired these genes recently from a common origin. On the nifH phylogenetic tree, the branch containing the test strains and reference species isolated from woody legumes in Africa was clearly separate from those isolated outside the continent, suggesting that these symbionts have a long history of separate evolution within *Ensifer* for this gene. A cross-inoculation study showed that our strains were capable of eliciting effective noduleation on the homologous host and on other host species. This suggests a potential to improve nitrogen fixation by selecting for broad-host-range inoculants. Our study confirms the presence of a wide diversity of *Ensifer* in East Africa and, while contributing to the general knowledge of the biodiversity within the genus, also highlights the need to focus on previously less-well-explored biogeographical regions to unravel as-yet-identified rhizobial resources.
Agreement with that of 16S rRNA. Similarly, phylogenetic relationships based on the symbiosis-related genes nodC, nodA, and nifH were generally similar to those shown by the core genes, suggesting that these Acacia and Sesbania symbionts have a long history of separate evolution within Mesorhizobium. Cross inoculation experiments demonstrated a large variation in the ability of the test strains to elicit effective nodules. The Sesbania isolates, occupying a distinct clade in the nod Phylogenetic tree, formed effective nodules only with this host legume. The study strongly suggests that this collection of Mesorhizobium strains comprises several new species, and also indicates the role of the symbiotic genes in determining the host range of these bacteria.

Key words: Mesorhizobium, Housekeeping genes, Acacia species, Sesbania sesban, Symbiotic genes, Host range

Abstract: To evaluate critical trace element loads in native vegetation and calculate soil-to-plant transfer factors (TFs), 11 trace elements (Cr, Co, Ni, Cu, Zn, As, Se, Mo, Cd, Pb and Mn) have been determined in leaves of 9 taxonomically verified naturally growing terrestrial plant species as well as in soil samples collected around 3 Ethiopian Rift Valley lakes (Koka, Ziway and Awassa). The Cr concentration in leaves of all the plant species was higher than the "normal" range, with the highest level (8.4 mg per kg dw) being observed in Acacia tortilis from the Lake Koka area. Caper species (Capparis fascicularis) and Ethiopian dogstooth grass (Cynodon aethiopicus) from Koka also contained exceptionally high levels of Cd (1 mg per kg dw) and Mo (32.8 mg per kg dw), respectively. Pb, As and Cu concentrations were low in the plant leaves from all sites. The low Cu level in important fodder plant species (Cynodon aethiopicus, Acacia tortilis and Opuntia ficus-indicus) implies potential deficiency in grazing and browsing animals. Compared to the Canadian environmental quality guideline and maximum allowable concentration in agricultural soils, the total soil trace element concentrations at the studied sites are safe for agricultural crop production. Enrichment factor was high for Zn in soils around Lakes Ziway and Awassa, resulting in moderate to high transfer of Zn to the studied plants. A six step sequential extraction procedure on the soils revealed a relatively high mobility of Cd, Se and Mn. Strong association of most trace elements with the redox sensitive fraction and mineral lattice was also confirmed by partial redundancy analysis. TF (mg per kg dw plants/mg per kg dw soil) values based on the total (TF(total)) and mobile fractions (TF(mobile)) of soil trace element concentrations varied widely among elements and plant species, with the averaged TF(total) and TF(mobile) values ranging from 0.01-2 and 1-60, respectively. Considering the mobile fraction in soils should be available to plants, TF(mobile) values could reflect trace element transfer to plants in the most realistic way.
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However, the present study indicates that TF(total) values also reflect the transfer of elements such as Mn, Cd and Se to plants more realistically than TF(mobile) values did.


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**Abstract:** Concentrations of heavy metals commonly known to impact the environment and other related trace elements were quantified in the water bodies of nine Ethiopian rift-valley lakes and six rivers (their inflows) as well as in effluents from two factories. In about half of the samples the concentrations of As was 10-700 µg l\(^{-1}\) and Se, ranged from 10 to 28 µg l\(^{-1}\), were much higher than the maximum permissible level (MPL) according to international standards for drinking water. Mercury (Hg) was detected in four lakes and one river with high values ranging from 2 to 165 µg l\(^{-1}\). Concentrations of Mo in three soda lakes were as high as 544-2590 µg l\(^{-1}\). Iron (Fe) was found in high concentrations (567-4969 µg l\(^{-1}\)) in three lakes, which are known to be discolored from inorganic colloids. Levels of Cd, Pb, and Cr ranged between 5 and 9, 12 and 20 and 104 and 121 µg l\(^{-1}\), respectively. The rest of the heavy metals analyzed, Ba, Cu, Mn, Ni and Zn, were either not detected in the samples or were found in much lower concentrations than the MPL for drinking water. Effluent from a tannery contained about 15, 141, 523, and 19 µg l\(^{-1}\) of As, Cr, Fe, and Se, respectively, and effluent from a textile factory contained high concentrations of As (10.6), Hg (3.8) and Se (20) µg l\(^{-1}\). Compared to more industrialized regions and other African lakes the concentrations of heavy metals in Ethiopian rift-valley lakes (with the exception of the soda lakes) and their inflows were low.


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**Abstract:** The chemical characteristics and phytoplankton biomass (measured as chlorophyll-\(a\) concentrations) of seven lakes and one reservoir in the Ethiopian rift-valley were studied during the wet and dry seasons between 1990 and 2000. Mean concentrations of three major plant nutrients (nitrate-nitrogen, soluble reactive phosphorus, and silicate) increased during the wet seasons in four of the seven lakes, presumably as a result of mixing events and input from runoff. The changes in the major nutrient concentrations in the rest of the lakes were variable, but concentrations were usually higher during the dry seasons, most likely as a response to temporal variation in the phytoplankton biomass. pH measurements of the lakes did not show marked differences between the wet and dry seasons. Salinity (measured as conductivity) and total ions seemed to increase during the wet seasons in some of the lakes, possibly as a result of inflows that might carry high concentrations of solutes due to the heavy rains. Chlorophyll-\(a\) concentrations were higher during the dry seasons in most lakes except in three relatively more productive lakes. The results suggest that there could be light limitation in some of the Ethiopian rift-valley lakes, and events associated with the wet and dry seasons could bring about contrasting changes in nutrient levels and phytoplankton biomass in lakes, depending on the physical characteristics of the lakes.

**Key words:** Ethiopian rift-valley lakes; seasons; salinity; nutrients; chlorophyll-\(a\); light limitation

*Zinabu G.M.\(^1\) Elizabeth Kebede-Westhead\(^2\), Zerihun Desta\(^1\), 2002. Long-term changes in chemical features of waters of seven Ethiopian rift-valley lakes, *Hydrobiologia*, 477(1-3): 81-91

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Abstract: Chemical and chlorophyll a concentrations of seven Ethiopian rift-valley lakes were studied during 1990-2000. Results were compared with studies made between 1960 and 1990 in an attempt to detect long-term changes. Three different trends are apparent in the salinities (and the correlates conductivity, alkalinity, sodium concentration) of these lakes over the last 40 years: three lakes (lakes Zwai, Shalla and Abaya) have maintained their salinity levels from the 1960s, two lakes (lakes Langano and Awassa) have become more dilute, and the salinity levels of Lake Chamo and the soda lake Abijata have increased. Concentrations of silicate decreased in almost all the lakes whereas soluble reactive phosphorus (SRP) increased in most lakes. Chlorophyll a concentrations were higher in the recent samples from all lakes except two, which in conjunction with results from SRP and silicate analyses suggest eutrophication in four out of the seven lakes studied. The study relates salinization in lakes with closed drainage to increased human activities in their catchments, intensified by changes in climate during the last three decades in sub-Saharan Africa.

Key words: Water quality, nutrients, chlorophyll a, salinity, rift-valley lakes


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Abstract: The chemical composition of the effluent from the Awassa textile factory was quantified and its effects on chlorophyll-a concentration and fish fry were examined. The effluent contained high concentrations of toxic heavy metals, and concentrations of about 70% of all the elements measured were higher (by 10 to 100 times) in effluent treated in ponds (biological lagoons) than straight from the factory, presumably due to concentration by evaporation. Chlorophyll-a concentration in lake water samples containing 10% and 20% textile effluent from the ponds increased by 5 to 1400% and 7 to 4000%, respectively, whereas the changes in the control were -24% to 433%. About 18% and 53% of the fish fry died within 12 hr in 10% and 20% pond effluent in lake water, respectively. The highest mean mortality level was about 64% in the 20% effluent treatment at 24 hr. It was concluded that the effluent treatment ponds of the factory do not efficiently reduce the chemicals in the discharge. The observed effects of the "treated effluent" on phytoplankton biomass and fish fry indicate the undesirable effects the effluent will have on Lake Awassa. It is recommended that an alternate waste disposal system for the textile factory be set up, with regular monitoring of its effectiveness, so as to avoid undesirable long-term changes to the lake.

Key words/phrases: Chemical composition, chlorophyll-a, fish fry, effluent, textile factory


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Abstract: Some soda lakes in East Africa are extreme with respect to their high abundance of bacteria and phytoplankton. We used regression analysis of 52 samples from 18 lakes in Ethiopia to demonstrate that soda lakes conform to a different relationship between bacterial abundance and phytoplankton biomass. The exponent of the power function relating bacteria and chlorophyll is much steeper for saline lakes, although still less than one. This may reflect that bacteria in eutrophic soda lakes are more substrate limited, and less controlled by grazers.

*Zerihun Desta¹,², Reidar Borgstrøm¹, Bjørn Olav Rosseland¹, Elias Dadebo², 2007. Lower than expected mercury concentration in piscivorous African sharptooth catfish Clarias gariepinus (Burchell), Sci Total Environ. 15;376(1-3): 134-42.

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Abstract: The concentrations of total mercury (THg), stable isotopes of nitrogen (δ15N) and carbon (δ13C), and the diet of the African sharptooth catfish Clarias gariepinus in Lake Awassa, Ethiopia, were studied from January 2003 to February 2004. Values of the δ15N were used as an index of trophic position in four length groups and compared to actual stomach contents. The diet of C. gariepinus within the length range of 201–600 mm LT mainly consisted of the small barb Barbus paludinosus, aquatic insects, and mollusks. The proportion of fish prey in the diet was 60% by volume, irrespective of fish size. The differences in δ15N values of individuals within and between length classes were less than 3‰, and were not significantly related to total length, showing the similarity in trophic niche of the different sizes, which corresponded to recorded stomach contents. Mercury concentrations were in the range of 0.002–0.154 mg kg−1 ww, and had no significant relationship to total length. Hence, even large specimens of C. gariepinus have Hg values below the WHO threshold of 0.2 mg kg−1 ww. The slope of the regression line between log [Hg] and δ15N was small, 0.06, indicating the absence of trophic shifts and biomagnification of Hg in larger specimens in our samples. The low Hg concentrations in C. gariepinus compared to the Hg concentrations in other piscivorous fish species in Lake Awassa, such as Barbus intermedius and B. paludinosus, may be due to its dependence on invertebrate preys at small size, diet switching towards low Hg prey fish at larger size, and growth biodilution owing to higher growth rate.

Key words: Mercury, Piscivory, δ15N, δ13C, Growth dilution, East Africa

COLLEGE OF MEDICINE AND PUBLIC HEALTH

SCHOOL OF MEDICAL LABORATORY TECHNOLOGY


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Abstract

Background: Data on lipid profile abnormalities among patients receiving highly active antiretroviral treatment in Ethiopia are very limited. The aim of this study was to determine the prevalence of dyslipidemia and characteristics of lipid profiles among patients living with human immunodeficiency virus (HIV) using first-line highly active antiretroviral therapy (HAART) in Southern Ethiopia.

Methods: This cross sectional comparative group study was conducted between March and May 2012, and included 113 HIV infected patients treated for a minimum of one year with first-line HAART regimens that included Efavirenz and Nevirapine (HAART group) and others 113 who had never received HAART (pre-HAART group). Serum lipid profiles were determined after overnight fasting and dyslipidemia was assessed according to the United State National Cholesterol Education program-III guideline. For statistical analysis Chi-square, student’s t-test, and logistic regression were used using Statistical Package for Social Sciences (SPSS) Version 20.

Result: Ninety-three (82.3%) of HAART and 87 (76.9%) pre-HAART patients had at least one laboratory abnormality, which is compatible with a diagnosis of dyslipidemia. Total cholesterol ≥ 200 mg/dl occurred in 43.4% of HAART and 15.9% pre-HAART patients (p=<0.0001), whereas HDL-cholesterol below 40 mg/dl occurred in 43.4% and in 63.7% respectively, (p=0.002). The LDL-cholesterol ≥ 130 mg/dl occurred in 33.6% of HAART and 15% pre-HAART patients (p=0.001), while triglycerides ≥ 150 mg/dl occurred in 55.8% and 31.0% respectively, (p=0.001). Receiving of HAART was significantly and positively associated with raised total cholesterol, LDL-cholesterol, and triglycerides. The adjusted odds ratio (95% CI) of HAART-treated vs. pre-HAART was 3.80 (1.34-6.55) for total cholesterol ≥ 200 mg/dl; 2.64 (1.31-5.32) for LDL cholesterol ≥ 130 mg/dl and 2.50 (1.41-4.42) for triglycerides ≥150 mg/dl.

Conclusion: Use of first-line antiretroviral therapy regimens that contain Efavirenz & Nevirapine were associated with raised total cholesterol, LDL-cholesterol, and triglycerides, an established atherogenic lipid
profiles. Lipid profiles should be performed at baseline before commencement of antiretroviral therapy and then periodically through treatment follow-up to monitor any rising trends.

**Key words:** Dyslipidemia, HIV/AIDS, Antiretroviral therapy, Ethiopia

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**Abstract**

**Background:** In many areas of the world, including Ethiopia, malaria and helminths are co-endemic, therefore, co-infections are common. However, little is known how concurrent infections affect the epidemiology and/or pathogenesis of each other. Therefore, this study was conducted to assess the effects of intestinal helminth infections on the epidemiology and clinical patterns of malaria in southern Ethiopia where both infections are prevalent.

**Methods:** A cross-sectional study was conducted in 2006 at Wondo Genet Health Center and Bussa Clinic, southern Ethiopia. Consecutive blood film positive malaria patients (N=230) and malaria negative asymptomatic individuals (N=233) were recruited. Malaria parasite detection and quantification was diagnosed using Giemsa-stained thick and thin blood films, respectively. Helminths were detected using direct microscopy and formol-ether concentration techniques. Coarse quantification of helminths ova was made using Kato Katz method.

**Results:** The overall magnitude of intestinal parasitic infection was high irrespective of malaria infection (67\% among malaria positive patients versus 53.1\% among malaria non-infected asymptomatic individuals). Trichuris trichiura infection was associated with increased malaria prevalence while increased worm burden of helminths as expressed by egg intensity was associated with increased malaria parasitaemia which could be a potential factor for development of severe malarial infection with the course of the disease. Majority (77\%) of the subjects had multiple helminths infection. T. trichiura, Ascaris lumbricoides, Schistosoma mansoni, and hookworm infestation accounted for 64.5, 57.7 \%, 28.4\%, and 12.2\% of the infections, respectively.

**Conclusions:** Populations in malaria-endemic areas of southern Ethiopia are multi-parasitized with up to four helminths. Mass deworming may be a simple practical approach in endemic areas in reducing the risk of severe malarial attack particularly for those at high risk of both infections.

**Key words:** Malaria, Helminthic infections, Co-infection, Ethiopia

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Abstract

Background: Both helminth and malaria infections result in a highly polarized immune response characterized by IgE production. This study aimed to investigate the total serum IgE profile in vivo as a measure of Th2 immune response in malaria patients with and without helminth co-infection.

Methods: A cross-sectional observational study composed of microscopically confirmed malaria positive (N = 197) and malaria negative (N = 216) apparently healthy controls with and without helminth infection was conducted at Wondo Genet Health Center, Southern Ethiopia. A pre-designed structured format was utilized to collect socio-demographic and clinical data of the subjects. Detection and quantification of helminths, malaria parasites and determination of serum IgE levels were carried out following standard procedures.

Results: Irrespective of helminth infection, individuals infected by malaria showed significantly high levels of serum IgE compared with malaria free apparently healthy controls (with and without helminth infections). Moreover, malaria patients co-infected with intestinal helminths showed high level of serum IgE compared with those malaria patients without intestinal helminths (2198 IU/ml versus 1668 IU/ml). A strong statistically significant association was observed between malaria parasite density and elevated serum IgE levels (2047 IU/ml versus 1778 IU/ml; P = 0.001) with high and low parasitaemia (parasite density >50,000 parasites/μl of blood), respectively. Likewise, helminth egg loads are significantly associated with elevated serum IgE levels (P = 0.003).

Conclusions: The elevated serum IgE response in malaria patients irrespective of helminth infection and its correlation with malaria parasite density and helminth egg intensity support that malaria infection is also a strong driver of IgE production as compared to helminths.

Key words: Helminths, Malaria, Th2, IgE, Ethiopia

Abraham W1, Adamu A1, and *Deresse D1, 2010. The involvement of men in family planning an application of transtheoretical model in Wolaita Soddo Town South Ethiopia, Asian Journal of Medical Sciences 2(2): 44-50

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Abstract: The objective of this study was to assess the involvement of men in fertility preference and contraceptive use by using of Tran theoretical model of behaviour change. Community based cross-sectional survey was done in Wolaita zone, Soddo town Southern Ethiopia. Pre-tested, structured questionnaires were used for data collection. Using SPSS version 15 software packages did data entry and analysis. About 96% of the respondents were familiar with at least one family planning method, 65.5% of married men currently practice family planning method 77.5% were approved use of contraception and about 60% of study participant discussed the issue of family planning. Behavioural stage of men in family planning method use of men 26.7% were in the pre-contemplation stage, 7.8% contemplation, 4.5% preparation, 16.1% in the action stage 49.4% in maintenance stage. The study found high prevalence of knowledge of contraceptive methods among married men, low utilization of male methods of family planning. Discussion between spouses and their joint decision making on contraceptive use was also found to be high. Most of men behavioural stage of was in maintenance/action stage. Targeted Stage based IEC intervention were recommended.

Key words: Male involvement, transtheoretical model, targeted IEC Intervention


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Abstract

Background: KAP Study tells what people know about certain things, how they feel and how they behave.

Methods. Hierarchal logistic regression (quantitative), multistage sampling (quantitative) design was employed.

Result: Three-fourth of the respondents diagnose childhood eye disease by other individuals than health professionals, 52.92% of them either don’t know or misunderstand the mode of transmission. Nearly half & 41.0% of mothers/caregivers misperceive that the risk is higher in poorer families & can be completely cured by praying. Two-third of children either received nothing or inappropriate medication.

Conclusion: There were misunderstanding, misperception, malpractice and poor health seeking behavior of mothers/caregivers about childhood eye diseases. Marital & occupational status, source & time to fetch water, presence of animals in the near vicinity and waste disposal system are reasons. Awareness creation, tailored behavior change interventions are recommended.

Key words: KAP, Childhood eye care, Ethiopia


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Abstract

**Background:** HIV infection and highly active antiretroviral therapy (HAART) can induce metabolic disturbances including lipodystrophy, dyslipidemia, and insulin resistance, which are reminiscences of metabolic syndrome (MS). However, little is known regarding the magnitude of MS in Ethiopian HIV population. This study, aimed to estimate the prevalence of MS among HIV positive patients with and without HAART.

**Methods:** A cross-sectional study was conducted at Hawassa University Referral Hospital, southern Ethiopia between February 2012 and April 2013. Data on demographic and anthropometric characteristics were collected from a total of 374 HIV positive participants (188 on ART and 186 on Pre-ART) using WHO stepwise approach. Fasting blood glucose, total cholesterol, triglyceride, HDL-cholesterol and LDL-cholesterol was measured. The International Diabetes Federation (IDF) and the National Cholesterol Education Program: Adult Treatment Panel III (ATP) Criteria were used to define MS.

**Result:** Of the 374 study participants 68% were females, and 50.3% were receiving ART. Using the IDF criteria, metabolic syndrome was diagnosed in 25% of patients receiving ART compared to 22.5% of the ART naïve group (OR: 1.14 CI: 0.71–1.84). Using the ATP criteria, the prevalence of MS was 18.1% in the ART groups compared to 15.6% in ART naïve group (OR: 1.20, CI: 0.69–2.06). Patients receiving ART had significantly elevated Cholesterol, triglyceride, glucose and LDL-c levels but lower CD4+ cell counts than the Pre-ART groups. Being a female, having BMI of at least 25, older age (i.e. age _ 45 years) and having total cholesterol of at least 200 mg/dl were significantly associated with the presence of MS. Using the ATP criteria to define MS, taking d4T-3TC-EFV regimen was significantly associated with higher odds of MS.

**Conclusion:** Almost a quarter of HIV patients on ART developed metabolic syndrome. Furthermore patients on ART had elevated lipid profile and glucose metabolism disturbance than the ART naïve.

**Key words:** Metabolic syndrome, HIV, ART, ATP, IDF


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Abstract

**Background:** As preclinical medical students start and/or enter the course, they go through the anatomy curriculum, which involves interaction with cadavers and cadaveric material. The objective of this study was to determine the reactions of preclinical medical students from year two and year three to the dissecting room.

**Methods:** Questionnaire was distributed to all second and third year medical students. The questionnaire was designed with the objective of identifying specific patterns of attitudes held and problems faced by the students in their first exposure to the human cadaver. The results are analyzed statistically using the SPSS 16.0 software and P< 0.05 was considered statistically significant.

**Results:** The commonest symptoms experienced were loss of appetite (43.29% year 2 and 34.86 % third year students). The commonest cause of their symptoms was studied and the result shows that it was the smell of the dissection room, as reported by 67.01% of year two students; and 54.12% for year 3 students.

**Conclusion:** The present study findings show that smell of the dissection room, touch and fear of cadaver were the commonest cause of their symptoms experienced while study in dissection room for the majority of students. Thus, instructors should give awareness raising education before the commencement of the dissection session to the students both mentally and emotionally ready to do their work enthusiastically and confidently. Moreover, it is necessary to make the laboratory tidy for the students so that they develop a love for the dissection room.

**Keywords:** Anatomy, dissecting room, preclinical students, student reactions, stress, learning methods

*Deresse Daka¹, Dereje Lelissa¹ and Aderajew Amsalu¹, 2013. Prevalence of anaemia before and after the initiation of antiretroviral therapy at ART centre of Hawassa University Referral Hospital, Hawassa, South Ethiopia, Scholarly Journal of Medicine, 3(1): 1-6

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Abstract: Ethiopia has experienced a rapid expansion in access to Antiretroviral Therapy (ART) for Human Immunodeficiency Virus (HIV) infected patients. HIV associated anaemia is always overseen and it could be a challenge for prognosis of patients who are taking ART. The prevalence of anemia due to HIV at the early stage of infection is more prevalent than in the late stage. Knowing the impact of HIV on the haematopotosis of HIV infected patients is very essential for the management and care of people living with Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS). HIV related anaemia decreases the quality of life and survival rate of HIV patients. We conducted a cross sectional analysis of hospital based retrospective study using a hospital secondary data. A total of 384 adult (.d15 years) patients with complete information of Cluster Difference (CD4) cell count, haemoglobin and hematocrit levels and red blood cell count were used from the registration book starting from 2005 to 2010. The measurement of Haemoglobin, CD4 + T cell, Hematocrit and Red Blood Cell (RBC) count was measured using standard methodology at baseline and after 6 months of antiretroviral therapy (ART). Paired t-test was used to assess mean differences for haemoglobin and CD4 + T cell count before and after ART initiation. The aim of this study was to determine prevalence of HIV associated anaemia before and after initiation of antiretroviral therapy (ART) in HIV infected adults. Of the 384 study subjects 90(23.4%) were anemic before ART. However, the prevalence of anemia after ART 46(12.0%) significantly decreased (p<0.05). The prevalence of anemia was higher in females than in males at base line (77.8 vs. 22.2%) (p=0.017), and after ART treatment (65.2 vs. 34.8%) (p=0.000).

**Key words:** Prevalence, highly active antiretroviral therapy (HAART), anaemia.


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Abstract

Background: Quarter milk samples from cows were examined to determine the prevalence of Staphylococcus aureus and different antibiotic resistant pattern were determined in a cross-sectional study design.

Objective: The objective of this study was to isolate Staphylococcus aureus from samples of cow’s milk obtained from Hawassa area and to determine their antibiotic susceptibility patterns.

Method: A total of 160 milk (CCP1-CCP5) samples were collected and screened for the presence of S. aureus. Gram staining, oxidase, catalase, DNase, haemolysis and coagulase tests were employed for bacterial identification.

Results: All the samples were contaminated with S. aureus. A total of 78 S. aureus isolates were obtained during this study. The levels of contamination with S. aureus were higher in milk obtained from CCP1, CCP2, CCP3, CCP4 and CCP5 at Hawassa area farms (18.0%, 25.6%, 27.0%, 21.8% and 7.7%) respectively. A large percentage of the S. aureus isolates (25.6% and 27.0%) were from CCP2 and CCP3. All strains were resistant to Penicillin G (PG) (10 µg), Ampicillin (AP) (10 µg), Amoxicillin-Clavulanic acid (AC) (30 µg), Ciprofloxacin (CIP) (5 µg), Erythromycin (E) (15 µg), Ceftriaxone (CRO) (30 µg), Trimethoprim-Sulfamethoxazole (TMP-SMZ) (25 µg) Oxacillin (Ox) (1 µg) and Vancomycin (V) (30 µg), 67.9%, 70.9%, 30.9%, 0%, 32.1%, 23.1%, 7.7%, 60.3% and 38.5% respectively.

Conclusion: The proportion of isolates resistant to CIP, TMP-SMZ, CRO, AC, E and V were low compared to AP, PG and Ox. S. aureus is normally resident in humans; therefore, the S. aureus present in the cow’s milk may have resulted from transmission between the two species, emphasizing the need to improve sanitary conditions in the milking environment.

Keywords: Antibiotics, S. aureus, Milk


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Abstract: Garlic (Allium sativum) has had an important dietary and medicinal role for centuries. It is a large annual plant of the Liliaceae family, which grows in most of Africa and in Ethiopia. Ethiopian garlic is used in traditional medicine for infectious disease and some other cases. The present study tested the aqueous extract of garlic in vitro for its antibacterial activity. The extract showed concentration dependent antibacterial activity against Staphylococcus aureus. The traditional use of Ethiopian garlic for infectious diseases and for controlling fever appears to be justified.

Key words: Garlic (A. sativum), Staphylococcus aureus, antibacterial activity.

*Deresse Daka¹, Eskindir Loha¹ and Araya Giday¹, 2011. Streptococcus pneumoniae and antimicrobial resistance, Hawassa Referral Hospital, South Ethiopia, Journal of Medical Laboratory and Diagnosis, 2(3): 27-30

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Abstract: Bacterial resistance to antimicrobial agents is an increasing problem in many areas of the tropics. To assess drug resistance pattern of Streptococcus pneumoniae among clinically diagnosed cases of pneumonia, meningitis and otitis media in Hawassa Referral Hospital, Southern Ethiopia. A cross sectional survey was conducted on 152 cases from sputum, cerebrospinal-fluid, and ear discharge samples. Blood agar and Muller-Hinton agar were used to culture samples. Biochemical tests and antibiotic susceptibility tests were also done. Gram staining and microscopic examinations were carried out. The mean age of the study subjects was 26.9 years (range: 1 month to 55 years); 61.2% were males. Of cultured 152 patients’ samples 21.4% growth Streptococcus pneumoniae. The highest resistance rate was seen for ampicillin and penicillin but lowest for chloramphenicol. Sixty four point two percent (64.2%) of the isolates were resistant to two or more antimicrobial agents. S. pneumonia shows highest resistance for ampicillin and penicillin.
Academic Success Depends on Research and Publications

**Key words**: Streptococcus pneumoniae, drug resistance, antimicrobial agents, antibiotics susceptibility test.


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**Abstract**: The objective of this study was to evaluate the use of cotrimoxazole prophylaxis in people living with HIV/AIDS, in Hawassa referral hospital, Southern Ethiopia. This was a retrospective evaluation. A total of 216 patient history cards from Hawassa hospital were included in the study. SPSS v.16 was used to analyze this study. A total of 216 patient cards were collected and analyzed for a drug use evaluation of cotrimoxazole prophylaxis in people living with HIV/AIDS in Hawassa referral Hospital. Out of 216 participants 140(64.8%) female and 76(35.2%) were male and one hundred eighty eight (87%) uses appropriate dose of the cotrimoxazole and 28(13%) is inappropriate dose. Our data revealed that there was an improvement on HIV patient CD4, CD8, WHO staging and body weight after the use of cotrimoxazole. In fact this is not the only factor that improves these parameters however; it is the basic agent to come the improvement with other factors. This study had not addressed on monitoring the patient conditions such as some hematological results, due to lack of data on these profiles. So that hematological tests such as complete blood cell count (CBC) and chemistry tests like creatinine clearance should be monitored every six months.

**Key words**: Body weight, cotrimoxazole, HIV/AIDS, CD4, CD8 and WHO staging


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**Abstract**: the main objective of this study is to assess the antibacterial effect of crude preparation of garlic on diarrhea causing bacteria (*E. coli*, Salmonella trains and Shigella strains). The minimum inhibition concentration (MIC) and minimum bactericidal concentration (MBO) of garlic samples on *E. coli*, Salmonella trains and Shigella strains was investigated by an agar dilution technique. The garlic was washed with distilled water removed the outer layers, crushed, dried, powdered with mortar and pestle, sieved with a mesh and filtered; finally known mas of the filtered powdered was thoroughly mixed with distilled water and the concentration was determined. Then media was prepared by missing the Muller Hinton agar with, carrying amounts of crude preparation of garlic to give the final concentration of 7.50, 15.0, 22.50, 30.0, 37.50, 45.00, 52.50, and 60.00mg/ml of media and the final volume of 20ml. four antibiotics were included with similar dilution. The result was compared with the effects of the same concentrations of some modern drugs. Garlic has antibacterial effects in vitro, but this study indicated that garlic (*A. sativum*) is superior to some antibiotics. Crude preparation of garlic could be used as effective antibacterial agent. However, pharmacological standardization and clinical evaluation on the effect of garlic are essential.


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**Abstract**

**Background**: CD4 count is a standard measure of immunodeficiency in adults infected with HIV to initiate and monitor highly active antiretroviral therapy; however, it may not be feasible in resource poor countries. There is a need to have another marker of immunodeficiency that is less resource demanding.
Objective: The objective of this study was to assess the relationship between total lymphocyte count and CD4 count in one of the resource poor countries, Ethiopia.

Methods: This was a retrospective evaluation. A total of 2019 cases with total lymphocyte and CD4 counts from three hospitals (Yirgalem, Hossana and Arba-Minch) were included in the study. Pearson correlation, linear regression and Receiver Operating Characteristic (ROC) were used.

Result: For adults, the sensitivity, specificity, positive and negative predictive values of TLC < 1200 cells/mm3 to predict CD4 count < 200 cells/mm3 were 41%, 83.5%, 87.9% and 32.5%, respectively. For subjects aged less than 18 years, these values were 20.2%, 87%, 82% and 27.1%, respectively. A TLC ≤ 1780 cells/mm3 was found to have maximal sensitivity (61%) and specificity (62%) for predicting a CD4 cell count of < 200 cells/mm3. Meanwhile, a TLC ≤ 1885 cells/mm3 would identify only 59% of patients with CD4 count of <350 cells/mm3 (sensitivity, 59%; and specificity, 61%). The combined sensitivity and specificity for patients above 40 years of age was greater.

Conclusion: Our data revealed low sensitivity and specificity of TLC as a surrogate measure for CD4 count.

*Ejara Tolossa¹, Birhan Meshesha¹ and Amanuel Alemu Abajobir², 2013. Assessment of level of knowledge and utilization of emergency contraception among female students of Hawassa University, south Ethiopia, Advances in Reproductive Sciences, 1(3): 51-56

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Abstract

Introduction: Emergency contraception is used as an emergency procedure to prevent unintended pregnancy secondary to an unprotected sexual intercourse and method failure. Hence, this study assessed the level of knowledge and utilization of emergency contraception among undergraduate female students of Hawassa University, south Ethiopia.

Methods: An institution-based cross-sectional survey was conducted among female students of Hawassa University in December 2012. Seven hundred seventy-six of the students were sampled by using multistage sampling technique. Pre-tested structured questionnaire was used to collect the data.

Results: The majority 719 (92.7%) of female university students ever had sexual intercourse and 17 (2.2%) experienced forced sex. Eight (47%) of these 17 students experienced unintended pregnancy all of which resulted in an induced abortion. Three hundred seventy-nine (72.2%) of the respondents had knowledge about emergency contraceptives and only 41 (10.8%) of them had ever used emergency contraceptives; oral contraceptive pills were the most widely used form of all emergency contraceptives 41 (10.8%). Age, marital status and age at menarche were associated with knowledge of emergency contraception; moreover, residence, year of study and experience of forced sex were found to be predictors of emergency contraception utilization.

Conclusion: Female university students had been experiencing high rate of unintended sexual practice and pregnancy, low knowledge level and utilization of emergency contraceptives; moreover, they had no youth-friendly access to the services. Therefore, there is a need for collaborated effort to improve service access and scale up their utilization level to prevent unwanted pregnancy.

Key words: Emergency Contraception; Knowledge; Utilization; Female Students; Ethiopia


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Abstract: This study evaluated the seroprevalence of hepatitis E virus among blood donors attending blood transfusion Center of Suez Canal University Hospital from March to September, 2010. Four hundred eighty eight (488) subjects which consisted of 137 Anti-Hepatitis C virus positive donors, 35 Hepatitis B surface antigens positive donors and 316 blood donors who were negative Hepatitis B surface antigen, Anti-
Hepatitis C virus and HIV were included in this study. Anti-hepatitis E virus (IgG and IgM) was detected in 17.7, 28.57, and 26.28% of blood donors negative for Hepatitis B surface antigen (HBsAg) and Anti-Hepatitis C virus, Hepatitis B surface antigen (HBsAg) positive and Anti- Hepatitis C virus positive donors, respectively. No significant (P > 0.05) association was found between anti- Hepatitis E virus positivity and Hepatitis B surface antigen (HBsAg) positivity and anti-Hepatitis C virus positivity subjects. The overall prevalence of anti- Hepatitis E virus antibodies (IgG and IgM) was 20.9% (102/488). Seroprevalence increased significantly with age; from 8.3% in subjects below 20 years of age, 16.94% in 20-34 years of age, 34.5% in 35-49 years of age and a slight decline of 33.3% over those of 50 years of age. All anti-HEV antibodies samples were negative for Hepatitis E virus RNA by reverse transcriptase polymerase chain reaction (RT-PCR) method. Even though, seroprevalence of hepatitis E virus antibody among blood donors in our study in Ismailia, Egypt is high, transfusion-associated with hepatitis E infection still needs further investigation.

Key words: Hepatitis E virus, Blood donors, seroprevalence.

Endale Tadesse¹, Gebru Mulugeta² and *Techalew Shimelis¹, 2013. Evaluation of SD BIOLINE rapid antibody test for diagnosis of Helicobacter pylori infection, Journal of Medical Laboratory and Diagnosis, 4(5): 62-66

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Abstract
Helicobacter pylori infection is most prevalent and known to cause chronic gastritis and peptic ulcer disease in Ethiopia. To date, simple and rapid point-of-care tests are commercially available; however, information is limited regarding their diagnostic significance. This cross-sectional study was conducted to evaluate the diagnostic performance of SD BIOLINE H. pylori rapid antibody test. A consecutive 203 enzyme linked immunosorbent assay (ELISA) confirmed sera (148 H. pylori positive and 55 negative) from dyspeptic patients were tested using SD BIOLINE H. pylori kit (Standard Diagnostic Inc, Korea) at Hawassa Teaching and Referral Hospital, southern Ethiopia from October, 2012 to January, 2013. Individuals under 15 years old, who were on anti- H. pylori treatment during the month prior to the study, those with discordant ELISA results, and refused to participate, were excluded. The sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of the SD BIOLINE H. pylori test kit were 95.3, 94.5, 97.9, 88.1 and 95.1%, respectively. Therefore, this point-of-care test could be used as alternative to ELISA testing and best fit our context.

Key words: Helicobacter pylori, point-of-care, ELISA, SD BIOLINE.

*Endale Tadesse¹ Million Teshome², Yared Merid³, Belayhun Kibret⁴ and Techalew Shimelis¹, 2014. Asymptomatic urinary tract infection among pregnant women attending the antenatal clinic of Hawassa Referral Hospital, Southern Ethiopia, BMC Research Notes, 7: 155

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Abstract
Background: Untreated asymptomatic bacteriuria (ASB) during pregnancy may cause serious complications including pyelonephritis and delivery of premature or low-birth-weight infants. However, little is known about asymptomatic bacteriuria in pregnancy in Ethiopia. This study aimed to assess the prevalence of asymptomatic bacteriuria, bacterial agents, and their antibiotic susceptibility pattern in pregnant women attending antenatal clinic of the Hawassa Teaching and Referral Hospital.
Methods: A cross-sectional study was conducted in a total of 244 pregnant women with no sign and symptom of urinary tract infection from March 2012 to September 2012. Clean catch mid-stream urine samples were collected from all study participants using sterile containers. Urine samples were cultured using standard bacteriological methods. Identification of suspected colonies and antibiotic sensitivity testing were done.

Result: Out of 244 pregnant women, 46(18.8%) were positive for asymptomatic bacteriuria (Colony Forming Unit ≥105/mL). There was no difference in prevalence of asymptomatic bacteriuria with respect to age (p = 0.07) and trimester (p = 0.27). The most frequently isolated bacteria were coagulase negative Staphylococcus (32.6%), followed by Escherichia coli (26.1%), and Staphylococcus aureus (13%). The susceptibility rate of bacterial isolate was highest for norfloxacin (64.7%) and lowest for ampicillin (17.6%).

Conclusion: The high prevalence of ASB in pregnant women warrant the need to screen all pregnant women and treat those infected with appropriate antimicrobial regimens in order to reduce its complications.

Key words: Asymptomatic bacteriuria, Urinary tract infection, Pregnant women


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Abstract

Background: Helicobacter pylori is the main etiology of peptic ulcers and chronic gastritis. Various studies showed that blood type ‘O’ is more common among patients with peptic ulcer. The aim of this study was to determine the seroprevalence of H. pylori antibodies and its relationship with ABO/Rhesus blood groups, age, sex and residence of symptomatic patients in southern Ethiopia.

Methods: A cross-sectional study was conducted in a total of 408 consecutive patients with upper abdominal complaints at Hawassa University Hospital from October 2012 to January 2013. Data on demographic factors was collected from all participants using questionnaires. Blood samples were also collected and tested for ABO and Rh blood group phenotype using hemagglutination test and for anti-H. pylori antibody (IgG) using two different ELISAs.

Results: The overall seroprevalence of H. pylori infection was 83.3% (340/408), and it was significantly higher in rural (71.2%) compared to urban residents (28.8%) (p = 0.008). Participants with blood group AB, A, O, B, and Rh positive had H. pylori prevalence of 88.9, 84.2, 83.7, 80.9, and 83.5%, respectively. H. pylori infection was not significantly influenced by age, sex, occupation, educational status and ABO/Rh status (p >0.05).

Conclusion: The high seroprevalence of H. pylori infection especially among rural residents calls for immediate intervention measures so that its clinical consequences could be minimized. ABO/Rh blood group was not found to be associated with H. pylori infection.

Key words: Helicobacter pylori, ABO blood groups, Seroprevalence


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Abstract: Post-operative wound infections as well as emergence and spread of drug resistant strains have been found to pose a major problem in the field of surgery. This study investigated common aerobic bacterial isolates and their antimicrobial susceptibility patterns in patients with clinical diagnosis of post-surgical wound infections. Microbial analysis was carried on pus samples obtained from 194 patients with clinical
diagnosis of postsurgical wound infections at Hawassa Teaching and Referral Hospital, from November 2010 to March 2011. The isolation rate of aerobic bacteria was 138 (71.1%). *S. aureus* was the most frequent isolates (37.3%); followed by *E. coli* (25.4%), *Klebsiella species* (13.6%), *Proteus* (10.2%), *P. aeruginosa* (10.2%) and coagulase negative *Staphylococci* (3.4%). Single and multiple antimicrobial resistances were observed in 6.8% and 93.2% of the isolates, respectively. No bacterial isolates was found to be sensitive to all antibiotics tested. The high isolation rate of aerobic bacteria and their increased resistance to the commonly used antibiotics warrants the need to practise aseptic procedures and rational use of antimicrobial agents leading to minimize infection rate and emergence of drug resistance.

**Key words**: Aerobic bacteria, post-surgical wound, antimicrobial, susceptibility

*Mengistu Hailemariam¹, Tariku Lambiyo¹, Adane Mihret¹ and Tamrat Abebe¹, 2012. Prevalence of Neisseria gonorrhea and their antimicrobial susceptibility patterns among symptomatic women attending Gynecology outpatient Department in Hawassa Referral Hospital, Hawassa, Ethiopia, Ethiop J Health Sci., 22(3): 10-8

¹Department of Medical Laboratory Sciences, Hawassa University, Ethiopia (mengemariamzenebe@gmail.com)

**Abstract**

**Background**: Gonorrhoeae, a sexually transmitted disease caused by *Neisseria gonorrhea* for which humans are the only natural host. The causative organism is highly adapted to the genital tract and often causing asymptomatic and undetected infection in females in which Acquisition of gonococcal infection late in pregnancy can adversely affect labor and delivery as well as the well-being of the fetus. The aims of this study were to determine the prevalence and drug susceptibility pattern of Neisseria gonorrhea among symptomatic women in Hawassa Referral Hospital.

**Methods**: A cross-sectional study was conducted from December 1 2010 to February 30, 2011 at Hawassa Referral Hospital. All women who visited gynecology outpatient department (OPD) with suspected gonococcal infection were included. Endocervical swab was collected by the attending physician. The presence of gonorrhea was confirmed by culture, gram staining and biochemical tests. Antimicrobial sensitivity test was performed using disc diffusion method and the result was interpreted accordingly.

**Results**: Of the total 215 cases examined, 11 (5.1%) were confirmed to have gonococcal infection. Although not statistically significant, most of the cases 5/11 (45.5%) were in age group of 20-24 years and the identified organism had low level susceptibility to quinolones (ciprofloxacin 55%, ofloxacin 64% & lomefloxacin 64%).

**Conclusion**: Despite low rates of gonorrhea infection, it is important to focus on high-risk populations (reproductive age group) because of the great physical and emotional costs of the disease. A high resistance for quinolones, the commonly used antibiotics was observed for this laboratory-based diagnosis is recommended.

**Key words**: *Neisseria gonorrhea*, drug susceptibility, symptomatic women, Southern Ethiopia

*Mesfin Worku¹ and Muluken Bekele¹, 2014. Bacterial isolate and antibacterial resistance pattern of ear infection among patients attending at Hawassa University Referral Hospital, Hawassa, Ethiopia, Indian Journal of Otology, 20(4)

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**Abstract**

**Background**: Ear infection is highly prevalent worldwide.In the older child, long-standing Chronic Suppurative Otitis Media can result in a severe conductive hearing loss with significant drawbacks in learning, communication, and social adjustment. It is associated with hearing impairment, death, and severe disability due to central nervous system involvement in developing countries. Objective: To determine the bacteriological profile and antibacterial resistance of ear infection from patients seen at Ear Nose and Throat clinic of Hawassa University Referral Hospital.
**Materials and Methods:** A cross-sectional study was conducted at clinic of Hawassa University Referal Hospital.

**Result:** A total 117 study subjects included in this study from June 2013 to October 2013. Among these, 57 (48.7%) were male and 53 (45.3%) were children. Bacteria identified from positive ear swabs were: Staphylococcus aureus 24 (20.5%), Pseudomonas aeruginosa 17 (14.5%), Klebsiella species 10 (8.5%), Proteus species 7 (6.0%), Enterobacter species 4 (3.4%), Escherichia coli 3 (2.6%), Citrobacter species 2 (1.7%), and Providencia species 2 (1.7%). The overall sensitivity and resistance profile of antibacterial agent, Amikacin (90.0%) and Gentamycin (89.1) showed high level of antibacterial effect on all identified bacterial species. On other hand, all isolates were highly resistant to ampicillin (87.5%), oxacillin (84.0%), cephraxone (82.8%), cephaplatin (81.4%), and penicillin G (73.8%).

**Conclusion:** Most of the isolates were resistant to commonly prescribed drug in the area. However, Amikacin and Gentamycin were highly active against the isolated organism, whereas Ciprofloxacin was moderately active. Therefore, culture and susceptibility test is vital for appropriate management of ear infection in study area.

**Key words:** Antibiotic susceptibility pattern, Ear infection, Ethiopia

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**Million Belay¹, Seid Abrar¹, Debela Bekele¹, Derese Daka¹, Mogens Derbe¹ and *Misganaw Birhaneselassee¹, 2013. HIV/AIDS patients’ satisfaction on ART laboratory service in selected governmental hospitals, sidama zone, southern Ethiopia, Science Jou. of Public Health, 1(2): 85-90**

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**Abstract**

**Background:** Monitoring HIV/AIDS patient satisfaction is important and useful tool for quality improvement on ART laboratories in particular and health care organizations in general. Objectives: To assess satisfaction of HIV/AIDS patients at selected governmental hospitals, Southern Ethiopia, Sidama Zone.

**Methodology:** A cross-sectional descriptive survey was conducted at Hawassa University Referral Hospital and Yirgalem Zonal Hospital ART laboratories. Data were collected using face-to-face interviews with HIV/AIDS patients at the exit of the ART laboratories. Statistical analysis was conducted using SPSS for windows version 20 & Epi info 7.1.

**Results:** The rate of satisfaction of patients was statistically different among the study hospitals (p-value = 0.00). The Likert scale results of patient satisfaction of the laboratory services revealed that the mean rating values ranged from 3.07 (±0.96) to 4.25 (±0.56) out of a possible 5. While the patients were satisfied with the quality of laboratory in general and cleanliness and attractiveness of the laboratory room, they were dissatisfied with the location and cleanliness of the latrines used for specimen collection and information provided to patients during specimen collection.

**Conclusion:** HIV/AIDS patients were generally satisfied with many of the ART laboratory services. There were differences in the levels of satisfaction of HIV/AIDS patients among the laboratories in the study hospitals in Southern Ethiopia, Sidama zone. There was a lower satisfaction rate observed in Hawassa University Referral Hospitals than in Yirgalem hospitals. Recommendations: The hospital administrators and laboratory chiefs should work on the enhancement of laboratory services. Hospital administration needs to work with laboratory units in designing laboratory infrastructure. A concerted effort to improve the cleanliness of the latrines is needed.

**Key words:** HIV/AIDS Patients, Satisfaction, ART Laboratory Services

*¹Misganaw Birhaneselassee¹, Asaye Birhanu², Amha Gebremedhin³ and Aster Tsegaye², 2013. How useful are complete blood count and reticulocyte reports to clinicians in Addis Ababa hospitals, Ethiopia, BMC Hematol. 13: 11

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Abstract

Background: Complete blood count (CBC) and reticulocyte (Retics) are routine hematology tests useful for the differential diagnosis of anemia and other medical conditions. However, it has been presumed that they are not used as regularly as they should be in medical practice in Addis Ababa hospitals.

Methods: A hospital-based cross-sectional questionnaire survey was conducted during November-December 2010, in which 408 clinicians participated and their response on the use of CBC and Retics was assessed. The always/ frequently (A/F) response was considered to reflect routine use of the CBC/Retics parameters by the clinicians. The Chi square test was used to study statistical associations among different variables.

Result: Only four of 13 parameters in CBC were frequently or always used by more than 85% of the clinicians. Health Officers were observed to use 12 of the 13 CBC parameters less than the other professional group; interns and residents demonstrated highest use of CBC results. More than a third of clinicians’ preferred white blood cell (WBC) differential report in percentages than the more useful absolute number report. Reticulocyte parameters were not being used by majority of clinicians in patient management. Clinicians rated ‘average’ regarding the adequacy of clinical laboratory methods course they took during medical education. As service users, clinicians indicated mm3 as unit of preference in cell count on the laboratory report form.

Conclusion: Overall, most clinicians do not use much of the data provided on routine CBC report. Additional research is needed to understand the issue further. Responsible bodies should promote the appropriate use of CBC/Retics reports by clinicians.

Key words: Complete blood count, Reticulocyte count, Differential leukocyte count, Clinicians, Laboratory report form, Clinical laboratory methods course


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Abstract

Background: Salmonella is the most frequently reported cause of food borne illness in Ethiopia. Objective: The aim of this study was to screen food handlers in the Dilla area of Southern Ethiopia and to assess the scale of carriage of Salmonella species and to offer prophylaxis followed by re-testing and advice on personal and food hygiene as appropriate.

Method: Stool samples were collected from a total of 107 food handlers from various establishments in the area. Enrichment culture using Selenite broth and sub-culture on to Deoxycholate Citrate agar was used followed by identification to genus level by use of a commercially available biochemical kit and polyvalent antisera.

Result: Salmonella was isolated from one food handler only and this person could not be traced having left her employment and not having left a forwarding address.

Conclusion: As food poisoning is a main issue in Ethiopia further epidemiological research, to monitor those found to be infected is mandatory.

Keywords: Salmonella, Screening, Food handlers, Asymptomatic


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Abstract

Background: HIV is isolated in 1983, human immunodeficiency Virus (HIV), the agent that causes acquired immune deficiency syndrome (AIDS), is classified as members of the lentivirus subfamily of retroviruses.
Academic Success Depends on Research and Publications

Although HAART is known to profoundly suppress viral replication, it increases CD4 cell count and delays disease progression and death; patients on Highly Active Antiretroviral Therapy (HAART) commonly suffer from side effects of the drug. Each antiretroviral drug is associated with specific adverse effects.

**Objective:** The aim of this retrospective cohort study was to describe immunological response among HIV-infected individuals receiving highly active antiretroviral therapy (HAART) with long-term follow-up.

**Method:** A Cohort retrospective study design was conducted to assess immunological (the CD4+ recovery) among HIV-infected individuals receiving highly active antiretroviral therapy (HAART) with long-term follow-up. ART-naive patients with symptomatic HIV disease at baseline (before ART) and after 6 and 9 and 12 months of ART was collected from records.

**Result:** A total of 887 HIV positive patients involved in this research; Out of these 472 (53.2%) were female and 415 (46.8%) male patients. None of them have any opportunistic infection during the time of follow up. The mean age of the study group was 36.76 (17-76). The mean baseline CD4+ count was 81.40; the mean CD4 count at the 6th, 9th and 12th month was 191.65, 284 and 331 respectively. There was a good immune recovery at the 6th month of therapy from the baseline mean CD4+ T cell count of 81 cells/µl to 191.65 cells/µl, which was statistically significant (p<0.0001). This first remarkable rise was continued in the achieving in the mean CD4+ count of 284cells/µl at the 9th month of visit. Followed by relatively steady lower increase and approaching stable CD4+ T cell count and 12th months of visit.

**Conclusion:** In this study, although good CD4 cells recovery in response to ART was documented in more than 81% of follow-up cases, HIV-positive patients were enrolled in ART program at decreased CD4 cells levels. As there is poor recovery of CD4 cell when the start <200 than when they start ART at CD4 count >200 CD4 cell therefore, interventions need to be designed to promote early HIV testing and early enrollment of HIV infected individuals into ART services. ART has considerably improved the immune recovery. We strongly recommend the need of ART in HIV infected patients for immune reconstitution should be started as early as possible. The differential recovery rate between those with base line CD4+ T cell count below 50cells/µl and above 500cells/µl needs further investigation.

**Key words:** Immunological response, CD+4, HIV/AIDS, HAART


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**Abstract**

**Background:** Hepatitis C virus (HCV) is considered the most common etiology of chronic liver disease in Egypt, which may progress to cirrhosis and hepatocellular carcinoma (HCC). Previous studies have documented an association between Helicobacter pylori (H. pylori) infection and liver cirrhosis with or without HCC. This study aimed to investigate the presence of H. pylori DNA in the liver tissue of Egyptian patients with chronic hepatitis C (CHC).

**Methods:** Fifty-two CHC Egyptian patients were enrolled in this study. Plasma anti-H. pylori IgG was assessed with ELISA. Liver biopsies were tested for presence of Helicobacter DNA using genus specific nested polymerase chain reaction (PCR) & species was identified by sequencing.

**Results:** Anti-H. pylori IgG was detected in 31/52 (59.6%) CHC patients while Helicobacter DNA was detected in 6 (11.5%) patients, all were H. Pylori by sequencing. Helicobacter DNA was more frequent in patients with high stage liver fibrosis (33.3%) than in those with low stage fibrosis (2.7%) (P = 0.006). There was no association between the presence of H. pylori DNA in the liver and age, gender of patients, liver function tests, AFP levels or viral load.

**Conclusions:** These data confirm the presence of H. pylori DNA in liver of some CHC Egyptian patients and suggest an association of this bacterium with progression of liver fibrosis.

**Key words:** HCV, Chronic hepatitis C, H. pylori, Liver fibrosis

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Academic Success Depends on Research and Publications


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Abstract

**Background**: Toxoplasmosis in immuno-compromised hosts manifests primarily as a life threatening condition, toxoplasmic encephalitis. However, there is scarce information about the magnitude of *Toxoplasma gondii* infection among HIV-infected people in Ethiopia. This study was, therefore, conducted to determine the sero-prevalence of *T. gondii* infection among HIV-infected and HIV-uninfected subjects.

**Findings**: Sera were collected from people with and without HIV infection for the purpose of studying hepatitis B virus (HBV) at St. Paul Hospital, Addis Ababa, Ethiopia from 24 January 2007 to 15 February 2007. Among these sera, the first 330 consecutive sera, 165 from each HIV serogroup, were selected and tested for anti-*T. gondii* IgG antibodies using Enzyme Linked Immunosorbent Assay. The seroprevalence of *Toxoplasma* infection was assessed against sociodemographic characteristics, HIV and HBV serostatus and HBV-related risk factors. The overall sero-prevalence of latent *T. gondii* infection among the study subjects was 90.0%. *Toxoplasma* infection was observed with respective prevalence of 93.3% and 86.7% among HIV-infected and HIV-uninfected people. Though *Toxoplasma* infection seems to be influenced by age, gender and HIV serostatus, only HBV serostatus was significantly associated (OR 2.71, CI 1.12 to 6.57) in multivariate logistic regression analysis.

**Conclusion**: The seroprevalence of latent *T. gondii* infection is high and similar by HIV status. Educating people to prevent acquisition of new *Toxoplasma* infection and minimizing the risk of disease manifestations among HIV-*Toxoplasma* co-infected individuals is important.


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Abstract

**Background**: Gastro-enteritis is associated with significant morbidity and mortality in patients with HIV/AIDS and children, and Cryptosporidium is the most important parasite implicated. To date, several commercial companies have developed simple and rapid point-of-care tests for the detection of Cryptosporidium infection; however, information is scarce regarding their diagnostic significance in Ethiopia. This study aimed at evaluating the performance of a rapid diagnostic test (RDT) for the detection of Cryptosporidium stool antigen.

**Methods**: A hospital-based cross-sectional study was conducted in Hawassa University Hospital, southern Ethiopia from May to November 2013. Faecal samples were collected from a total of 100 children and 250 HIV infected individuals with diarrhea or CD4 T-cell count lower than 200 cells/µl. Specimens were processed using direct, formol-ether concentration and modified Ziehl-Neelsen techniques for diagnosis of Cryptosporidium and other parasites. One hundred faecal samples (50 positives for Cryptosporidium, 35 positives for other parasites and 15 negatives for any intestinal parasites) were tested using the CoproStrip™Cryptosporidium kit (Savyon Diagnostics Ltd, Israel). Test parameters were calculated using microscopy of the modified Ziehl-Neelsen stained stool smear as reference method.

**Results**: The performance of the RDT was first compared to routine microscopic analysis (examination ≤10 min). The CoproStrip™Cryptosporidium RDT correctly detected 31 of 42 positive samples and 49 of 50 negative samples (i.e., 11 false negatives and 1 false positive). Sensitivity, specificity, PPV, NPV and accuracy were calculated to be 74, 98, 97, 84 and 88%, respectively. Upon thorough microscopic analysis (examination >10 min), 8 more samples with very low oocyst density were found. However, these were missed by the kit and lower the sensitivity and NPV to 62 and 72%, respectively. No cross-reactivity was observed with any of the helminthic or other protozoan parasites including *Isospora* and *Cyclospora* species.
Conclusion: Based on the results described herein, the CoproStrip™ Cryptosporidium test could be used as an alternative to conventional microscopy especially where diagnosis of Cryptosporidium is limited due to time constraints, lack of experienced microscopists or unavailability of appropriate equipment/electricity.

Key words: Evaluation, RDT, Cryptosporidium

SCHOOL OF MEDICINE


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Abstract

Background: The body of quantitative literature that described risky sexual behavior as a predisposing factor for HIV and other sexually transmitted infection are plenty. However, little is known how risky the sexual practices of university students are in this era, particularly in Ethiopia.

Methods: A qualitative research method was employed to explore the sexual behavior of undergraduate university students. Ten students’ focus group discussions and twenty three in-depth interviews were conducted. The study participants were purposively selected students, night time taxi drivers, nightclub owners, abortion service providers, members of campus police and addictive substance sellers.

Results: Both the focus group discussants and key informants emphasized that the sexual practices of some of Hawassa University female students were more risky than their counterpart male students. Some of the evidence the discussants pointed out were: the high number of female students competing with commercial sex workers in the night clubs; being the majority among women coming for abortion service; several local businessmen coming to the university campus to pick female students at night; and some female students being observed working in hotels as bar lady. Being away from family, academically poor, watching a sex film, peer pressure, attending night clubs, lack of control by the university and substance use were some of the predisposing factors for unsafe sex in both sex. These observations were further strengthened by the low utilization of condoms among students who practiced unsafe sex.

Conclusion: This study has shown that some of the students were engaged in risky sexual practice both as unprotected and with multiple partners. Involvement of parents, university officials and other significant community members in a forum discussing this issue with students may bring a change in the students’ sexual behavior

Key words: Ethiopia; risky sexual behavior; qualitative study; university students.


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Abstract

Background: Moringa stenopetala has been used in traditional health systems to treat diabetes mellitus. One of the successful methods to prevent of the onset of diabetes is to control postprandial hyperglycemia by the inhibition of α-glucosidase and pancreatic α-amylase activities, resulting in the aggressive delay of the carbohydrate digestion of absorbable monosaccharides. The aim of the present study is to investigate the effect of the extract of the leaves of Moringa stenopetala on α-glucosidase, pancreatic α-amylase, pancreatic
lipase, and pancreatic cholesterol esterase activities, and, therefore find out the relevance of the plant in controlling blood sugar and lipid levels.

**Methods:** The dried leaves of Moringa stenopetala were extracted with hydroalcoholic solvent and dried using rotary vapor under reduced pressure. The dried extracts were determined for the total phenolic compounds, flavonoid content and condensed tannins content by using Folin-Ciocanteu’s reagent, AlCl3 and vanillin assay, respectively. The dried extract of plant-based food was further quantified with respect to intestinal α-glucosidase (maltase and sucrase) inhibition and pancreatic α-amylase inhibition by glucose oxidase method and dinitrosalicylic (DNS) reagent, respectively.

**Results:** The phytochemical analysis indicated that flavonoid, total phenolic, and condensed tannin contents in the extract were 71.73 ± 2.48 mg quercetin equivalent/g of crude extract, 79.81 ± 2.85 mg of gallic acid equivalent/g of crude extract, 8.82 ± 0.77 mg catechin equivalent/g of crude extract, respectively. The extract inhibited intestinal sucrase more than intestinal maltase with IC50 value of 1.47 ± 0.19 mg/ml. It also slightly inhibited pancreatic α-amylase, pancreatic lipase and pancreatic cholesterol esterase.

**Conclusion:** The result demonstrated the beneficial biochemical effects of Moringa stenopetala by inhibiting intestinal α-glucosidase, pancreatic cholesterol esterase and pancreatic lipase activities. A daily supplement intake of the leaves of Moringa stenopetala may help in reducing hyperglycemia and hyperlipidemia.

**Keywords:** Moringa stenopetala, Phytochemical analysis, α-glucosidase, Pancreatic enzymes

*Alemayehu Toma¹, Eyasu Makonnen² and Getnet Yimer³, 2013. Role of zinc in diabetes mellitus, oxidative stress and other human healthy: a review article American, Journal of Research Communication, 1(11)

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**Abstract:** Diabetes mellitus is a leading cause of morbidity and mortality worldwide, with an estimated 346 million adults being affected in year 2011. The prevalence is expected to double between years 2025–2030. Some of the minerals are the essential part of some of the enzymes for their biological activities. As diabetes mellitus is a disease of metabolic abnormality so minerals as such or as a component of enzymes may be playing a significant role in development and control of diabetes mellitus. Amongst minerals, zinc is involved in the development and control of diabetes mellitus. Zinc has been shown to have an antioxidant potential through the non-enzymatic stabilization of biomembrane and biostructures. A recent finding indicated that there is a direct relationship between low zinc levels, greater body fat content, and insulin resistance. The individuals who were classified as zinc deficient had poorer insulin sensitivity and greater glucose intolerance. Zinc plays multiple roles in the body, affecting numerous chemical messengers that play complex, essential, interconnected biological activities in human beings. Zinc is involved in synthesis, secretion and storage of insulin and has antioxidant activity which makes zinc vital trace element in management of blood glucose level and its associated complication’s.

**Key words:** Zinc, diabetes mellitus, glycemic control, antioxidant effect, oxidative stress

*Alemayehu Toma¹ and Serawit Deyno¹, 2014. Phytochemistry and Pharmacological activities of Moringa Oleifera, IJP, 1(4): 222-231

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**Abstract:** *Moringa oleifera* can grow well in the humid tropics or hot dry lands, can survive destitute soils, and is little affected by drought. It tolerates a wide range of rainfall with minimum annual rainfall requirements estimated at 250 mm and maximum at over 3000 mm and a pH of 5.0–9.0. *Moringa* leaves have been reported to be a rich source of △-carotene, protein, vitamin C, calcium and potassium and act as a good source of natural antioxidants; and thus enhance the shelf-life of fat containing foods due to the presence of various types of antioxidant compounds such as ascorbic acid, flavonoids, phenolics and carotenoids. In the Philippines, it is known as ‘mother’s best friend’ because of its utilization to increase woman’s milk production and is sometimes prescribed for anemia. *Moringa oleifera* has both nutritional and
multimedicinal activity. Some of medicinal effects includes antimicrobial, antifungal, antihypertensive, antihyperlipidemic, antihyperglycemic, antipyretic, wound healing, antitumor, anticancer, antiinflammatory and for purification of water. Since Moringa oleifera can survive drought condition and its diet content is superior to vitamins and even than milk in protein content its nutritional benefit is indivisible. However, more rigorous study is required in order to achieve a level of proof required for full biomedical endorsement of Moringa oleifera.

Key words: Moringa Oleifera, hytochemistry, Pharmacological actions


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Abstract

**Background:** To promote rational drug use in developing countries, it is important to assess drug use pattern using the World Health Organization (WHO) drug use indicators. The aim of this study was to assess the drug prescription patterns at the Medical Outpatient Pharmacy of Hawassa University Teaching and Referral Hospital, using some of the WHO core drug use indicators.

**Methods:** A descriptive, quantitative, and cross-sectional survey was conducted to determine the current prescribing practices at Hawassa University Teaching and Referral Hospital. The sample was selected using systematic random sampling. 1290 patient encounters were reviewed retrospectively for a 2-year period from September 2007 to September 2009. Data were collected from prescriptions and Prescription registration books retained in the pharmacy.

**Result:** The average number of drugs prescribed per encounter or mean was 1.9 (SD 0.91) with a range between 1 and 4. The percentage of encounters in which an antibiotic or injection was prescribed was 58.1% (n = 749) and 38.1% (n = 491), respectively. The Percentage of drugs prescribed by generic name and from an essential drug list was 98.7% (n=2419) and 96.6% (n=2367), respectively. The most commonly prescribed forms of antibiotics were amoxicillin (16.4%), ampicillin (15%), gentamicin (14.9%) and chloramphenicol (11.6%). On the other hand, the most commonly prescribed injections were ampicillin (21.4%), cloxacillin (13.4%), crystalline penicillin (12.4%), ceftriaxone (9.8%) gentamicin (9.8%), dicylofenac (9.4%), chloramphenicol 41 (8.4%) and furosemide 25 (5.1%).

**Conclusion:** On the basis of the finding of this study, the prescribing practices for antibiotic and injection shows deviation from the standard recommended by WHO. These two commonly overused and costly forms of drug therapy need to be regulated closely. Drug use evaluation should be done for some of the antibiotics to check whether they were appropriately prescribed or not. On the other hand, polypharmacy, generic prescribing and prescribing from EDL were not found to be a problem in this study. Teaching hospitals have a special responsibility to society to promote rational prescribing by their staff and, through them, the future generations of doctors.

Key words: Rational or irrational drug use, WHO core drug use indicators, Prescribing pattern

*Anteneh Assefa Desalegn¹, Asres Berhan¹ and Yifru Berhan², 2014. Absenteeism among medical and health science undergraduate students at Hawassa University, Ethiopia, *BMC Medical Education* 14: 81

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Abstract

**Background:** Student absenteeism is a major concern for university education worldwide. This study was conducted to determine the prevalence and causes of absenteeism among undergraduate medical and health sciences students at Hawassa University.

**Methods:** We conducted a cross-sectional study using a pretested self-administered structured questionnaire from May-June 2013. The primary outcome indicator was self-reported absenteeism from lectures in the
semester preceding the study period. The study included all regular undergraduate students who were enrolled in the University for at least one semester. The data was entered and analyzed using SPSS version 20. The association between class absenteeism and socio-demographic and behavioral correlates of absenteeism was determined by bivariate and multivariate analyses. Results were reported as crude odds ratios (COR), adjusted odds ratios (AOR) and 95% confidence intervals (CI).

**Results:** 1200 students consented and filled the questionnaire. Of these students, 43.7% had missed three or more lectures and 14.1% (95% CI = 12.2-16.2) missed more than 8 lectures in the preceding semester. There was a significant association between missing more than 8 lectures and age of students, chosen discipline (medicine), and social drug use. The main reasons reported for missing lectures were preparing for another examination, lack of interest, lecturer’s teaching style, and availability of lecture material.

**Conclusion:** At Hawassa University College of Medicine and Health Science student habits and teacher performance play a role in absenteeism from lectures. A university culture that promotes discipline and integrity especially among medical and older students discourages social drug use will likely improve motivation and attendance. Training in teaching methodologies to improve the quality and delivery of lectures should also help increase attendance.

**Key words:** Non-attendance, Absenteeism, Lecture, Tutorial, University students

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**Background:** Cheating on examinations in academic institutions is a worldwide issue. When cheating occurs in medical schools, it has serious consequences for human life, social values, and the economy. This study was conducted to determine the prevalence of cheating and identify factors that influence cheating among students of Hawassa University College of medicine and health science.

**Methods:** A cross sectional study was conducted from May through June 2013. A pre-tested self-administered, structured questionnaire was used to collect self-reported data regarding cheating. Data were entered and analyzed using SPSS version 20. Descriptive statistics were used for data summarization and presentation. Degree of association was measured by Chi Square test, with significance level set at p = 0.05. Bivariate and multivariate logistic regression analyses were used to assess associations.

**Results:** The prevalence of self-reported cheating was found to be 19.8% (95% CI = 17.4-21.9). About 12.1% (95% CI = 10.2-13.9) of students disclosed cheating on the entrance examination. The majority of students (80.1% (95% CI = 77.9-82.3) disclosed that they would not report cheating to invigilators even if they had witnessed cheating. Analysis by multiple regression models showed that students who cheated in high school were more likely to cheat (adjusted OR = 1.80, 95% CI = 1.01-3.19) and that cheating was less likely among students who didn’t cheat on entrance examinations (adjusted OR = 0.25, 95% CI = 0.14–0.45). Dining outside the university cafeteria and receiving pocket money of Birr 300 or more were strongly associated with cheating (adjusted OR = 3.08, 95% CI = 1.54-6.16 and adjusted OR = 1.69 (95% CI = 1.05-2.72), respectively. The odds of cheating among students were significantly higher for those who went to private high school, were substance users, and didn’t attend lectures than for those who attended government schools, were not substance abusers, and attended lectures.

**Conclusion:** Our findings have important implications for development of an institution’s policies on academic integrity. By extension, they affect the policies of high schools. Increased levels of supervision during entrance examination, mandated attendance at lectures, and reduction of substance use are likely to reduce cheating. No significant association was found with background, level of parental education, grade point average, and interest in field of study.

**Key words:** Cheating, Lecture, Academic dishonesty, Higher institutions

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Academic Success Depends on Research and Publications

Abstract

Background: In Sub-Saharan Africa, the fight against tuberculosis (TB) has encountered a great challenge because of the emergence of drug resistant TB strains and the high prevalence of HIV infection. The aim of this meta-analysis was to determine the association of drug-resistant TB with anti-TB drug treatment history and HIV co-infection.

Methods: After electronic based literature search in the databases of Medline, HINARI, EMBASE and the Cochrane library, article selection and data extraction were carried out. HIV co-infection and previous history of TB treatment were used as predictors for the occurrence of any anti-TB drug resistant or multiple drug resistant TB (MDR-TB). The risk ratios for each included study and for the pooled sample were computed using the random-effects model. Heterogeneity test, sensitivity analyses and funnel plots were also done.

Results: The pooled analysis showed that the risk of developing drug-resistant TB to at least one anti-TB drug was about 3 times higher in individuals who had a previous history of anti-TB treatment than new TB cases. The risk of having MDR-TB in previously anti-TB treated TB cases was more than 5-fold higher than that of new TB cases. Resistance to Ethambutol and Rifampicin was more than fivefold higher among the previously treated with anti-TB drugs. However, HIV infection was not associated with drug-resistant TB.

Conclusion: There was a strong association of previous anti-TB treatment with MDR-TB. Primary treatment warrants special emphasis, and screening for anti-TB drugs sensitivity has to be strengthened.

Key words: Drug resistance, HIV, meta-analysis, previous treatment, tuberculosis, Sub-Saharan Africa.


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Abstract

Background: Previous reports on sexual behaviours and risks of HIV infection in relation to socioeconomic status of women were contradictory. The purpose of this study was to determine the consistency of risky sexual behaviour among women with regard to their age, residence, educational level and wealth index.

Methods: Subgroup and pooled meta-analysis was done on risky sexual behaviour and HIV prevalence of women aged 15 - 49 years using the recent Demographic and Health Surveys data (DHS 2003-2009) from 28 countries in and outside Africa. Pooled and individual countries odds ratios were calculated using Mantel-Haenszel (M-H) statistical method. Random effect analytic model was applied since there was significant heterogeneity among surveys (I² > 50%). Sensitivity analysis was also done to examine the effect of outliers.

Results: Out of 207,776 women reported to have sex within 12 months prior to the respective surveys, 36,530 (17.6%) were practicing higher-risk sex. Risky sexual behavior was found to have statistically significant association with women living in urban areas, attained secondary and above education and owned middle to highest wealth index. Sensitivity analysis demonstrated the stability of the pooled odds ratios for outliers. Better education attainment, high wealth index and being employed were also associated with high HIV prevalence.

Conclusion: This analysis has shown the high prevalence of higher-risk sexual behaviour and high HIV infection among wealthier and better educated women regardless of geographic location of the selected low to middle income countries. Further study is required to establish how and why being good in socioeconomic status associated with risky sexual behaviour.

Key words: Education; Employment; Higher-Risk Sex; HIV-Prevalence; Meta-Analysis; Residence; Wealth

*Asres Berhan¹ and Abiy Habtewolde², 2012. Effects of Vanadium compounds on glycemic control in Type 2 Diabetes Mellitus: A meta-analysis of comparative study on Rats, IJPSR, 3(10): 3717-3724

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Abstract

Aim: To assess the effect of vanadium compounds on glycemic control in diabetic rats.

Methods: Eligible studies were identified by searching two databases; one search engine was also used for search of articles from different data bases using standardized terms and Boolean logic. Statistical analysis was performed with Meta Analyst software.

Results: 56 relevant studies were found but only 8 studies met the inclusion criteria for this meta-analysis. Meta-analysis was done for blood glucose level from a pooled sample of 84 vanadium treated and 80 control diabetic rats. The analysis generated a combined standardized mean difference (Std. mean difference) of -5.21 and p< 0.00001 for blood glucose level. Additionally, all the included studies lay in favor of vanadium treatment. The meta-analysis for average weight and plasma insulin level did not show significant variation between vanadium treated and control diabetic rats.

Conclusion: This meta-analysis reaffirmed that, vanadium compounds are able to reduce significantly blood glucose level and other base line measures like food intake and fluid intake without affecting plasma insulin level and average weight.

Key words: Type 2 diabetic rats, Vanadium compounds, Meta-analysis

Asres Berhan¹ and *Yifru Berhan¹, 2013. Efficacy of alogliptin in type 2 diabetes treatment: a meta-analysis of randomized double-blind controlled studies, BMC Endocrine Disorders, 13: 9

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Abstract

Background: Alogliptin is a new dipeptidyl peptidase (DPP-4) inhibitor, which is under investigation for treatment of type 2 diabetes either alone or in combination with other antidiabetic drugs. The aim of this meta-analysis was to assess the efficacy and tolerability of alogliptin in patients with type 2 diabetes.

Methods: Computer based search was performed in MEDLINE, Cochrane library, and HINARI (Health InterNetwork Access to Research Initiative) databases. Meta-analysis was carried out by incorporating double-blind randomized controlled studies done on the efficacy of alogliptin in patients with type 2 diabetes. The efficacy and tolerability of alogliptin was determined by standardized mean differences (SMDs) and Mantel-Haenszel odds ratio. Heterogeneity was assessed by the chi-squared test (Cochran Q test) and I2 statistics.

Results: The pooled SMDs demonstrated a significant reduction in HbA1c in patients treated with alogliptin 12.5 mg (SMD = −0.81; 95% CI, -1.11 to −0.51) or alogliptin 25 mg (SMD= −0.98; 95%CI= −1.30 to −0.66) as compared with controls. The SMD for reduction in fasting plasma glucose level (FPG) from baseline was also statistically significant among alogliptin treated patients. However, the effect of alogliptin on body weight change was inconclusive. The proportion of patients who discontinued alogliptin due to adverse events was not different from controls. Similarly, the meta-analyses of specific adverse events did not demonstrate statistically significant differences. Conclusions: Alogliptin alone or in combination with other antidiabetic drug has shown a significant reduction in HbA1c and FPG level in patients with type 2 diabetes. However, its consistent efficacy for longer duration of therapy needs further investigation.

Key words: Alogliptin, Body weight, DPP-4 inhibitors, FPG, HbA1c, Meta-analysis, Type 2 diabetes

Asres Berhan¹ and *Yifru Berhan¹, 2012. Is the sexual behaviour of HIV patients on antiretroviral therapy safe or risky in Sub-Saharan Africa? Meta-analysis and meta-regression, AIDS Research and Therapy, 9:14 PMC3468370

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Abstract

Background: Reports on the sexual behavior of people on antiretroviral therapy (ART) are inconsistent. We selected 14 articles that compared the sexual behavior of people with and without ART for this analysis.

Methods: We included both cross-sectional studies that compared different ART-naïve and ART-experienced participants and longitudinal studies examining the behavior of the same individuals pre- and
post-ART start. Meta-analyses were performed both stratified by type of study and combined. Outcome variables assessed for association with ART experience were any sexual activity, unprotected sex and having multiple sexual partners. Random-effect models were applied to determine the overall odds ratios. Sub-group analyses and meta-regression analyses were performed to examine sources of heterogeneity among the studies. Sensitivity analysis was also conducted to evaluate the stability of the overall odds ratio in the presence of outliers.

**Results:** The meta-analysis failed to show a statistically significant association of any sexual activity with ART experience. It did, however, show an overall statistically significant reduction of any unprotected sex, having multiple sexual partners and unprotected sex with HIV negative or unknown HIV status with ART experience. Meta-regression showed no interaction between duration of ART use or recall period of sexual behavior with the sexual activity variables. However, there was an association between the percentage of married or cohabiting participants included in a study and reductions in the practice of unprotected sex with ART.

**Conclusion:** In general, this meta-analysis demonstrated a significant reduction in risky sexual behavior among people on ART in sub-Saharan Africa. Future studies should investigate the reproducibility and continuity of the observed positive behavioural changes as the duration of ART lasts a decade or more.

**Key words:** Antiretroviral therapy, Meta-analysis, Meta-regression, Multiple sexual partners, Unprotected sex, Sub-Saharan Africa


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**Abstract**

**Background:** This meta-analysis was conducted to determine the efficacy, safety and tolerability of tofacitinib in the treatment of rheumatoid arthritis in patients with an inadequate response or intolerance to at least one of the nonbiologic or biologic disease-modifying antirheumatic drugs (DMARDs).

**Methods:** Electronic based literature search was conducted in the databases of HINARI (Health InterNetwork Access to Research Initiative), MEDLINE and Cochrane library. The studies included in the meta-analysis were double-blind randomized clinical trials that were conducted in treatment-refractory or intolerant patients with rheumatoid arthritis. The odds ratios (OR), standardized mean differences (SMD) and the 95% confidence intervals (95% CI) were determined by using the random effects model. Heterogeneity among the included studies was evaluated by $\chi^2$ statistics.

**Results:** The odds of tofacitinib treated patients who met the criteria for an at least a 20% improvement in the American College of Rheumatology scale (ACR 20) was more than 4 times higher than placebo treated patients (overall OR = 4.15; 95% CI, 3.23 to 5.32). Even though the discontinuation rate due to adverse events was not different from placebo groups, tofacitinib was associated with infections (overall SMD = 1.96, 95% CI = 1.428 to 2.676), reduction in neutrophil counts (overall SMD = −0.34, 95% CI = −0.450 to −0.223) and elevated levels of LDL cholesterol and liver enzymes.

**Conclusions:** Tofacitinib was effective in the treatment of active rheumatoid arthritis in patients with an inadequate response or intolerance to at least one DMARDs. However, treatment with tofacitinib was associated with infections and laboratory abnormalities.

**Key words:** ACR 20 response, JAK Inhibitor, Meta-analysis, Rheumatoid arthritis, Tofacitinib

*Asres Berhan$^1$ and Alex Barker$^2$, 2013. Sodium glucose co-transport 2 inhibitors in the treatment of type 2 diabetes mellitus: a meta-analysis of randomized double-blind controlled trials, BMC Endocrine Disorders, 13: 58

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**Abstract**

**Background:** The discovery of sodium-glucose co-transporter 2 (SGLT2) inhibitors, with a novel mechanism
independent of insulin secretion or sensitization, bring about a new therapeutic approach to the management of type 2 diabetes mellitus. The aim of this meta-analysis was to evaluate the safety and efficacy of SGLT2 inhibitors at different doses in randomized double blind clinical trials.

**Methods**: This meta-analysis was conducted by including randomized double-blind controlled trials of SGLT2 inhibitors in patients with type 2 diabetes irrespective of their antidiabetic drug exposure history but with an inadequate glycemic control. All the effect sizes were computed using the random effects model. Standardized mean differences (SMDs) and odds ratios (OR) were computed for continuous and dichotomous variables, respectively. Additional analyses like sensitivity analysis, subgroup analysis and meta-regression were also performed.

**Results**: The pooled analyses demonstrated a significant reduction in mean changes in Hemoglobin A1c (HbA1c) (SMD = −0.78%, 95% CI, -0.87 to −0.69), fasting plasma glucose (FPG) (SMD = −0.70 mg/dl, 95% CI, -0.79 to −0.61), body weight (overall SMD = −0.59 kg, 95% CI, -0.65 to −0.52) and blood pressure from baseline with SGLT2 inhibitors based therapy. Consistently a significant number of patients treated with SGLT2 inhibitors achieved HbA1c < 7% (OR = 2.09, 95% CI, 1.77 to 2.46). SGLT2 inhibitors based therapy was associated with adverse events like genital and urinary tract infections.

**Conclusion**: All studied doses of SGLT2 inhibitors, either as monotherapy or in combination with other antidiabetic agents, consistently improved glycemic control in patients with type 2 diabetes. However, a small percentage of patients suffer from genital and urinary tract infections.

**Key words**: Canagliflozin, Dapagliflozin, Empagliflozin, Ipragliflozin, Meta-analysis, SGLT2 inhibitors, Type 2 diabetes

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Begna Tulu Eticha¹, Zufan Sisay², Addisu Alemayehu³ and *Techalew Shimelis⁴, 2013.

**Abstract**

**Objective**: To determine the prevalence of syphilis and its risk factors among people with HIV at a hospital in Ethiopia.

**Design**: A hospital-based cross-sectional study. **Setting**: This study was conducted at one of the largest public hospitals in Addis Ababa, Ethiopia. **Participants**: A consecutive 306 HIV-positive patients were recruited prospectively from January to March 2010. For comparative purposes, 224 HIV-negative consecutive attendees at the voluntary counselling and testing centre in the same period were also included. Participants under 15 years of age and treated for syphilis and with a CD4 T-cell count below 50 cells/mm³ were excluded. **Outcome measures**: Blood samples and data on sociodemographic and risk factors for syphilis were collected. Sera were screened for syphilis using rapid plasma reagin (RPR) test, and those positives were retested using Treponema pallidum haemagglutination assay (TPHA) test.

**Results**: The seroprevalence of syphilis among HIV infected individuals was 9.8% compared with 1.3% among HIV-uninfected individuals, OR 8.01 (95% CI 2.4 to 26.6; p=0.001). A comparable rate of syphilis was found among men (11%) and women (8.9%) with HIV infection. Syphilis prevalence non-significantly increased with age, with the highest rate in 40–49 years of age (16.9%). Except a history of sexually transmitted infections, which was associated with syphilis OR 2.25 (95% CI 1.03 to 4.9; p=0.042), other risk factors did not raise the odds of infection.

**Conclusions**: The high prevalence of syphilis among people with HIV infection highlights the need to target this population to prevent the transmission of both infections. Screening all HIV-infected people for syphilis and managing those infected would have clinical and epidemiological importance.

*Birkneh Tilahun¹, Bogale Worku¹, Erdaw Tachbele², Simegn Terefe³, Helmut Kloos⁴ and Worku Legesse⁵, 2012. High load of multi-drug resistant nosocomial neonatal pathogens carried by cockroaches in a neonatal intensive care unit at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia, Antimicrobial Resistance and Infection Control 1:12*
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Abstract

Background: Cockroaches have been described as potential vectors for various pathogens for decades; although studies from neonatal intensive care units are scarce. This study assessed the vector potential of cockroaches (identified as Blatella germanica) in a neonatal intensive care unit setup in Tikur Anbessa Hospital, Addis Ababa, Ethiopia.

Methods: A total of 400 Blatella germanica roaches were aseptically collected for five consecutive months. Standard laboratory procedures were used to process the samples.

Results: From the external and gut homogenates, Klebsiella oxytoca, Klebsiella pneumoniae, Citrobacter spp. Enterobacter cloacae, Citrobacter diversus, Pseudomonas aeruginosa, Providencia rettgeri, Klebsiella ozaenae, Enterobacter aeruginosa, Salmonella C1, Non Group A streptococcus, Staphylococcus aureus, Escherichia coli, Acinetobacter spp. and Shigella flexneri were isolated. Multi-drug resistance was seen in all organisms. Resistance to up to all the 12 antimicrobials tested was observed in different pathogens.

Conclusion: Cockroaches could play a vector role for nosocomial infections in a neonatal intensive care unit and environmental control measures of these vectors is required to reduce the risk of infection. A high level of drug resistance pattern of the isolated pathogens was demonstrated.

Key words: Blatella germanica, Multi-drug resistant pathogens, Neonatal intensive care unit, Ethiopia

*Birkneh Tilahun1 and Endale Tefera2, 2013. Transient left ventricular systolic dysfunction following surgical closure of large patent ductus arteriosus among children and adolescents operated at the cardiac centre, Ethiopia Journal of Cardiothoracic Surgery, 8: 139

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Abstract

Background: Patent ductus arteriosus (PDA) is one of the commonest congenital heart diseases that require closure within the first few months after birth. The residential area of patients affects the size of the PDA: living in highlands, like most places in Ethiopia, is a risk for having larger sized PDA. Closure of these congenital heart defects is usually performed at an early age in places where capable centers are available. In Ethiopia, closure of these defects is done on mission basis often at an older age. Recently, limited reports came about the occurrence of postoperative left ventricular systolic dysfunction (POLVD) following closure of PDA though full explanation is still lacking.

Objective: To determine the rate of and time to improvement of POLVD and the factors associated with it in children and adolescents who underwent surgical closure of PDA.

Method: All children and adolescents who underwent surgical closure of PDA at the Cardiac Center, Ethiopia (CCE) had postoperative follow up with echocardiography. Serial left ventricular ejection fraction (LVEF) and fiber shortening (FS) values were recorded for all of them. SPSS 20 was used to analyze the data.

Results: A total of 36 children and adolescents who underwent surgical closure of PDA from January 2009 to December 2012 and who fulfilled the inclusion criteria were studied. Their mean age at intervention was 8.52 years (SD = 5.23 years), 77.80% were females. The mean duct size as determined by either echocardiography or intraoperative by the surgeon was 10.31 mm (SD = 3.20 mm). They were followed for a mean duration of 24.80 months (SD = 12.36 months) following surgical closure of PDA. The mean LVEF and FS decreased from 65.06% and 35.28% preoperatively to 54.83% and 28.40% post-operatively respectively. Fifteen (42.86%) of the patients had a post-operative LVEF of less than 55%. The mean time to normalization of systolic function was 5.11 weeks (SD = 3.30 weeks). Having an associated cardiac lesion was an independent predictor of POLVD.

Conclusions: We conclude that there is a high rate of POLVD following surgical closure of large PDA in highlanders. We recommend a serial and systematic follow up of these children postoperatively. Those with
a significant cardiac dysfunction may need cardiac medications like Angiotensin Converting Enzyme Inhibitors (ACEI).

Key words: Large PDA closure, Highland, Systolic Dysfunction

Birrie Deresse¹, Getahun Mengistu¹, Guta Zenebe¹, Mehila Zebenigus² and James C. Johnston³, 2012. Electroencephalographic patterns in Ethiopian patients with epilepsy: A retrospective review, Ethiop. J. Health Dev., 26(2): 101-106

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Abstract
Background: Epilepsy is a common problem throughout sub-Saharan Africa, including Ethiopia. Electroencephalography (EEG) is useful for the diagnosis and proper treatment of this condition. However, the literature is scanty of reports describing EEG patterns in Ethiopian patients with epilepsy. This study attempts to bridge that gap and provide a baseline for further research into the etiological basis of specific epileptiform abnormalities.

Objective: To review EEG patterns in Ethiopian patients with epilepsy.

Methods: We retrospectively reviewed EEG records of patients with epilepsy presenting to a specialized referral hospital (Addis Ababa University Tikur Anbessa Teaching Hospital) and a private clinic (Yehuleshet Higher Clinic) between September 2008 and August 2010.

Results: Two hundred and fifty one patients with mean age of 26 years (SD 14.8) and 1.2:1 male: female ratio was included in the study. One hundred and forty nine patients (59.4%) harbored EEG abnormalities. The majority of these abnormalities 61.1% were epileptiform discharges; the remainder 38.9% being nonspecific patterns. The most common epileptiform discharges were focal, with or without secondary generalization in 63.7%. These focal discharges originated from the left cerebral hemisphere in 43.1% cases and the right in 39.7%; 17.2% were bilateral. Multifocal cerebral and temporal lobe discharges accounted for 43.1% and 39.7% of all focal discharges, respectively.

Conclusion: The most common EEG abnormalities in Ethiopian patients with epilepsy are focal interictal epileptiform discharges, typically originating from multifocal cerebral loci and the temporal lobe, without hemispheric lateralization. It provides a foundation for prospective studies to address the etiological basis of focal abnormalities.

*Daniel Seifu¹, Freshet Assefa² and Solomon M. Abay³, 2012. Medicinal plants as antioxidant agents: Understanding their mechanism of action and therapeutic efficacy, Research Signpost, 37/661 (2)

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Abstract: The present review focuses on the antioxidant activities of the various medicinal plants, their bioavailability, mechanism of action and therapeutic efficacy. Antioxidant of medicinal plant origin may exert their effects on biological systems by different mechanisms. Efforts have been made to explore the structure and functional groups that involve removing the oxidants that most often occurs in the biological systems. Some of the mechanisms have been dealt deeply in this review. Many oxidants have been implicated in a number of disease, removal or minimization of oxidants exposure and at the same time increasing the antioxidant ability of the biological system may reduce the damage. Medicinal plants produce significant amounts of antioxidants such as flavonoids, phenolics and polyphenolics compounds to prevent the body from oxidative stress that could be caused by reactive oxygen and nitrogen species. Therefore, this review assessed the role of important antioxidants to combat these reactive species.
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*Engida Yisma¹, Berhanu Dessalegn², Ayalew Astatkie³ and Nebreed Fesseha⁴, 2013. Completion of the modified World Health Organization (WHO) partograph during labour in public health institutions of Addis Ababa, Ethiopia, Reproductive Health, 10: 23

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Abstract

Background: The World Health Organization (WHO) recommends using the partograph to follow labour and delivery, with the objective to improve healthcare and reduce maternal and foetal morbidity and death. The partograph consists of a graphic representation of labour and is an excellent visual resource to analyze cervix, uterine contraction and foetal presentation in relation to time. However, poor utilization of the partograph was found in the public health institutions which reflect poor monitoring of mothers in labour and/or poor pregnancy outcome.

Methods: A retrospective document review was undertaken to assess the completion of the modified WHO partograph during labour in public health institutions of Addis Ababa, Ethiopia. A total of 420 of the modified WHO partographs used to monitor mothers in labour from five public health institutions that provide maternity care were reviewed. A structured checklist was used to gather the required data. The collected data were analyzed using SPSS version 16.0. Frequency distributions, cross-tabulations and a graph were used to describe the results of the study.

Results: All facilities were using the modified WHO partograph. The correct completion of the partograph was very low. From 420 partographs reviewed across all the five health facilities, foetal heart rate was recorded into the recommended standard in 129(30.7%) of the partographs, while 138 (32.9%) of cervical dilatation and 87 (20.70%) of uterine contractions were recorded to the recommended standard. The study did not document descent of the presenting part in 353 (84%). Moulding in 364 (86.7%) of the partographs reviewed was not recorded. Documentation of state of the liquor was 113(26.9%), while the maternal blood pressure was recorded to standard only in 78(18.6%) of the partographs reviewed.

Conclusions: This study showed a poor completion of the modified WHO partographs during labour in public health institutions of Addis Ababa, Ethiopia. The findings may reflect poor management of labour or simply inappropriate completion of the instrument and indicate the need for pre-service and periodic on-job training of health workers on the proper completion of the partograph. Regular supportive supervision, provision of guidelines and mandatory health facility policy are also needed in support of a collaborative effort to reduce maternal and perinatal deaths.

Key words: Modified WHO partograph, Completion, Public health institutions, Addis Ababa, Ethiopia.

Knowledge and utilization of partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia, BMC Pregnancy and Childbirth, 13(17): 1471-2393

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Abstract

Background: Globally, there was an estimated number of 287,000 maternal deaths in 2010. Eighty five percent (245,000) of these deaths occurred in Sub-Saharan Africa and Southern Asia. Among the causes of these deaths were obstructed and prolonged labour which could be prevented by cost effective and affordable
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health interventions like the use of the partograph. The Use of the partograph is a well-known best practice for quality monitoring of labour and subsequent prevention of obstructed and prolonged labour. However, a number of cases of obstructed labour do happen in health facilities due to poor quality of intrapartum care.

Methods: A cross-sectional quantitative study assessed knowledge and utilization of partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia using a structured interviewer administered questionnaire. The collected data was analyzed using SPSS version 16.0. Logistic regression analysis was used to identify factors associated with knowledge and use of partograph among obstetric care givers.

Results: Knowledge about the partograph was fair: 189 (96.6%) of all the respondents correctly mentioned at least one component of the partograph, 104 (53.3%) correctly explained the function of alert line and 161 (82.6%) correctly explained the function of action line. The study showed that 112 (57.3%) of the obstetric care givers at public health institutions reportedly utilized partograph to monitor mothers in labour. The utilization of the partograph was significantly higher among obstetric care givers working in health centres (67.9%) compared to those working in hospitals (34.4%) [Adjusted OR = 3.63(95%CI: 1.81, 7.28)].

Conclusions: A significant percentage of obstetric care givers had fair knowledge of the partograph and why it is necessary to use it in the management of labour and over half of obstetric care givers reported use of the partograph to monitor mothers in labour. Pre-service and on-job training of obstetric care givers on the use of the partograph should be given emphasis. Mandatory health facility policy is also recommended to ensure safety of women in labour in public health facilities in Addis Ababa, Ethiopia.

Key words: Partograph, Knowledge, Utilization, Obstetric care givers, Public health institutions, Addis

Esrael Ayele1, *Yifru Berhan1, 2013. Age at menarche among in school adolescents in Sawla town, South Ethiopia, Ethiop J Health Sci., 23(3): 189-200

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Abstract

Background: Although a declining trend in age at menarche has been observed in developed countries over decades commonly attributed to childhood excessive weight gain and sedentary life, little is known about this case in the developing countries.

Methods: A cross-sectional study design and multistage sampling was used to include 660 schooladolescents for analysis. Data collection included weight and height measurements. Multinomial logistic regression analyses were done for early and late age of menarche, in reference to average age at menarche, to measure the association of age at menarche with some socio-demographic variables and body habits.

Results: The mean age at menarche was 13.9±1.2 years (95%CI, 13.8-14.0). The menarche ages ranged between 10 and 12 years for 10.5%, 13 and 14 years for 54.5%, and 15+ years for 35%. Low menarche age was independently associated with high calorie consumption, high protein diet, more coffee intake, low physical activity and parents’ low educational background. Low body mass index, low parents’ income, exercise, and Amhara ethnic background were associated with late menarche age.

Conclusion: The mean menarche age found in this study was higher than the report from developed countries. But, the proportion of adolescents with low menarche age was comparable with reports from developed countries. Inactive adolescents were more likely to see menarche earlier than average age. Healthy eating habits, regular exercise and nutrition education need to be promoted among school children.

Key words: Adolescent, cross sectional, menarche age, Ethiopia

*Henok Tadele¹, Wubegzier Mekonnen² and Endale Tefera³, 2013. Rheumatic mitral stenosis in Children: more accelerated course in sub-Saharan Patients, BMC Cardiovascular Disorders, 13: 95

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Abstract

Background: Mitral stenosis, one of the grave consequences of rheumatic heart disease, was generally considered to take decades to evolve. However, several studies from the developing countries have shown that mitral stenosis follows a different course from that seen in the developed countries. This study reports the prevalence, severity and common complications of mitral stenosis in the first and early second decades of life among children referred to a tertiary center for intervention.

Methods: Medical records of 365 patients aged less than 16 and diagnosed with rheumatic heart disease were reviewed. Mitral stenosis was graded as severe (mitral valve area < 1.0 cm2), moderate (mitral valve area 1.0-1.5 cm2) and mild (mitral valve area > 1.5 cm2).

Results: Mean age at diagnosis was 10.1 ± 2.5 (range 3–15) years. Of the 365 patients, 126 (34.5%) were found to have mitral stenosis by echocardiographic criteria. Among children between 6–10 years, the prevalence of mitral stenosis was 26.5%. Mean mitral valve area (n = 126) was 1.1 ± 0.5 cm2 (range 0.4–2.0 cm2). Pure mitral stenosis was present in 35 children. Overall, multi-valvular involvement was present in 33 (90.4%). NYHA functional class was II in 76% and class III or IV in 22%. Only 25% of patients remember having symptoms of acute rheumatic fever. Complications at the time of referral include 16 cases of atrial fibrillation, 8 cases of spontaneous echo contrast in the left atrium, 2 cases of left atrial thrombus, 4 cases of thrombo-embolic events, 2 cases of septic emboli and 3 cases of airway compression by a giant left atrium.

Conclusion: Rheumatic mitral stenosis is common in the first and early second decades of life in Ethiopia. The course appeared to be accelerated resulting in complications and disability early in life. Echocardiography-based screening programs are needed to estimate the prevalence and to provide support for strengthening primary and secondary prevention programs.

Key words: Mitral stenosis, Valve area, Rheumatic heart disease, Sub-Saharan Africa


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Abstract

Background: More than 50 million people around the world are investigated for tuberculosis using sputum smear microscopy annually. This process requires repeated visits and patients often drop out.

Methods and Findings: This clinical trial of adults with cough $2 wk duration (in Ethiopia, Nepal, Nigeria, and Yemen) compared the sensitivity/specificity of two sputum samples collected “on the spot” during the first visit plus one sputum sample collected the following morning (spot-spot-morning [SSM]) versus the standard spot-morning-spot (SMS) scheme. Analyses were per protocol analysis (PPA) and intention to treat (ITT). A sub-analysis compared just the first two smears of each scheme, spot-spot and spot-morning. In total, 6,627 patients (3,052 SSM/3,575 SMS) were enrolled; 6,466 had culture and 1,526 were culture-positive. The sensitivity of SSM (ITT, 70.2%, 95% CI 66.5%–73.9%) was non-inferior to the sensitivity of SMS (PPA, 65.9%, 95% CI 62.3%–69.5%). Similarly, the specificity of SSM (ITT, 96.9%, 95% CI 93.2%–99.9%) was non-inferior to the specificity of SMS (ITT, 97.6%, 95% CI 94.0%–99.9%). The sensitivity of spot-spot (ITT, 63.6%, 95% CI 59.7%–67.5%) was also non-inferior to spot-morning (ITT, 64.8%, 95% CI 61.3%–68.3%), as the difference was within the selected 25% noninferiority limit (difference ITT = 1.4%, 95% CI 23.7% to 6.6%). Patients screened using the SSM scheme were more likely to provide the first two
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specimens than patients screened with the SMS scheme (98% versus 94.2%, p<0.01). The PPA and ITT analysis resulted in similar results.

**Conclusions:** The sensitivity and specificity of SSM are non-inferior to those of SMS, with a higher proportion of patients submitting specimens. The scheme identifies most smear-positive patients on the first day of consultation. Trial Registration: Current Controlled Trials ISRCTN53339491


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**Abstract**

**Background:** *Cryptosporidium* spp and *I. belli* are intestinal opportunistic infections associated with HIV/AIDS. A decline in the incidence of these opportunistic infections due to HAART was reported. We aim to investigate these parasites among HAART naïve and experienced HIV patients in south Ethiopia.

**Methods:** A cross sectional study was carried out among 268 HIV-positive patients between January and September, 2007. Interview with questionnaires and document reviews were used to collect data. Stool samples were obtained from each patient and parasites were examined by direct, formol-ether and modified Ziehl-Neelsen stain for *Cryptosporidium* spp and *I. belli*. Univariate and multivariate analysis were carried out. Level of significance was set at p-value of 0.05.

**Results:** A total of 268 patients participated in the study. The mean age was 34.0 (±1 SD of 8.34) years. Females constituted 53.4% (143) of the study participants. Half of the study participants were on HAART; majorities (85.8%) of such patients were within the first year of treatment. The prevalence of *Cryptosporidium* spp was 34.3% (92/268) and *I. belli* was 1.5% (4/268). Dual infection was detected in two patients (0.75%). The crude analysis revealed significant reduction in the odds of *Cryptosporidium* spp infection among patients who have started HAART (crude OR = 0.59, 95% CI 0.35, 0.98). The adjusted analysis remained in the same direction but has lost significance (Adj OR 0.65, 95%CI 0.35, 1.24). No differences in the risk of developing infection with *Cryptosporidium* spp were observed between groups based on most recent CD4 counts, sex, duration on HAART and age (p > 0.05 for all variables). Patients with Cryptosporidium spp were more likely to report vomiting [Adj OR 2.34 (95% CI 1.22, 5.41)], weight loss [Adj OR 2.10 (95% CI 1.15, 3.81)] and chronic diarrhea [Adj OR 3.35 (95%CI 1.05, 10.63)].

**Conclusion:** There is high burden of infection with Cryptosporidium spp among HIV infected individuals in southern Ethiopia but that of *I. belli* is low. We recommend considering infection with Cryptosporidium spp in HIV infected people with chronic diarrhea, weight loss and vomiting for HAART naïve patients and/or for patients who are within the first year of starting HAART.

**Key words:** Cryptosporidium spp, *I. belli*, Ethiopia, HIV

Mohammed Ahmed Yassin12, Roberta Petrucci1, Kefyalew Taye Garie2, Gregory Harper1, Isabel Arbide3, Melkamsew Aschalew4, Yared Merid2, Zelalem Kebede5, Amin Ahmed Bawazir1, Nabil Mohamed, Abuamer1 and *Luis Eduardo Cuevas*1, 2011. Can Interferon-Gamma or Interferon-Gamma-Induced-Protein-10 Differentiate Tuberculosis Infection and Disease in Children of High Endemic Areas? *PLoS One*, 6(9): e23733

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**Abstract**

**Background:** Diagnosis of childhood tuberculosis (TB) is difficult in high TB burden settings. Interferon-gamma-induced protein 10 (IP10) has been suggested as a marker of TB infection and disease, but its ability to differentiate the two conditions remains uncertain.
Objectives: To describe Interferon-gamma (INFc) and IP10 expression in children with TB infection and disease and controls to assess their potential to differentiate latent and active TB.

Methods: This was a cross sectional study of 322 1–15 years old children with symptoms of TB (28 confirmed, 136 probable and 131 unlikely TB), 335 children in contact with adults with pulmonary TB and 156 community controls in Southern Ethiopia. The Tuberculin Skin Test (TST) and Quantiferon-In-Tube (QFT-IT) were performed. INFc and IP10 were measured in plasma supernatants.

Results and Interpretation: Children with confirmed and probable TB and contacts were more likely to have TST+ (78.6%, 59.3% and 54.1%, respectively) than children with unlikely TB (28.7%) and controls (12.8%) (p<0.001). Children with confirmed TB (59.3%) and contacts (44.7%) were more likely to have INFc+ than children with probable (37.6%) or unlikely TB (28.1%) and controls (13.1%) (p<0.001). IP10 concentrations were higher in INFc+ children independently of TST (p<0.001). There was no difference between IP10 concentrations of children with confirmed TB and contacts (p = 0.8) and children with and without HIV (p>0.1). INFc and IP10 can identify children with TB infection and disease, but cannot differentiate between the two conditions. HIV status did not affect the expression of IP10.


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Abstract: Our study took place at 8 tuberculosis diagnostic and treatment centres in Sidama Zone, southern Ethiopia. Our objectives were to assess the status of TB treatment in children and risk factors associated with unfavourable outcome. A retrospective study was based on information retained in TB registers of the centres. Demographic characteristics and treatment outcome of children registered between 2002 and 2007 were retrieved. Risk factors for unfavourable outcome (failure, default or death) were calculated. Of 851 (165 with smear-positive, 475 smear-negative and 206 extrapulmonary TB) children, 655 (77%) were cured or completed and 124 (14.6%) had unfavourable outcome. Treatment success rate increased with age from 66% in children B5 y old to 81% in 5-9-y-olds and 85% in 10-y-olds (p<0.001). 75% of patients with smear-negative TB had favourable outcome compared to 80.6% for smear-positive cases (p<0.06). AgeB5 y, lack of smear conversion in the second month and living in rural areas were independent risk factors for unfavourable treatment outcome. In conclusion, the outcome of TB treatment varies with age, residency and smear results. Reporting only cases with smear-positive TB disproportionally excludes a higher proportion of children than adults. Surveillance systems to monitor TB outcome in children need to be improved.


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Summary Setting: Tuberculosis (TB) treatment centres in southern Ethiopia.
Objectives: To describe the outcomes of patients registered for anti-tuberculosis treatment and to identify factors associated with poor treatment outcome.
Design: Retrospective audit of patients registered from 2002 to 2007. Patients were categorised as having successful (cured or completed treatment) or poor treatment outcome (failed treatment, defaulted or died). Logistic regressions were used to identify risk factors for poor outcome.
Results: A total of 6547 patients (55.6% male, 44.4% female) with a mean age of 27.5 years were registered for treatment; 2873 (43.9%) were smear-positive, 2493(30.1%) smear-negative and 1157 (17.7%) had extrapulmonary TB. Most (n = 6033, 92%) were new cases; 4900 (74.8%) had a successful and 1095 (16.7%) a poor treatment outcome. Of those with a poor outcome, 667 (60.9%) patients defaulted, 404 (36.9%) died and 24 (2.2%) failed treatment. Attending the regional capital health centre (aOR 2.09, 95%CI 1.85–2.69), being on retreatment (aOR 2.07, 95%CI 1.47–2.92), having a positive smear at the second month
follow-up (aOR 1.68, 95%CI 1.07–2.63), having smear-negative pulmonary TB (aOR 1.62, 95%CI 1.07–1.86), age >55 years (aOR 1.44, 95%CI 1.12–1.86) and being male (aOR 1.24, 95%CI 1.09–1.42) were independent risk factors for poor outcome. 

**Conclusion**: Treatment outcome was suboptimal and targeted measures should be considered to reduce the rate of poor treatment outcome among high-risk groups.

**Key words**: Tuberculosis, treatment outcome, risk factors, Ethiopia

*Sintayehu Fekadu¹, Kefyalew Taye², Wondu Teshome³ and Solomon Asnake¹, 2013. Prevalence of parasitic infections in HIV-positive patients in southern Ethiopia: A cross-sectional study, J Infect Dev Ctries; 7(11):868-872

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**Abstract**

**Introduction**: Intestinal parasitic infections are a major public health burden in tropical countries. Although all HIV/AIDS patients are susceptible to parasitic infections, those having lower immune status are at greater risk. The aim of this study was to determine the prevalence of intestinal parasitic infections in patients living with HIV/AIDS.

**Methodology**: This was a facility-based cross-sectional study. A total of 343 consecutively sampled HIV/AIDS patients from the HIV care clinic of Hawassa University Referral Hospital were included. Subjects were interviewed for demographic variables and diarrheal symptoms using structured questionnaires. Stool examinations and CD4 cells counts were also performed.

**Results**: The prevalence of intestinal parasitic infection was 47.8% among HIV/AIDS patients; single helminthic infection prevalence (22.7%) was higher than that the prevalence of protozoal infections (14.6%). About 54% of study participants had chronic diarrhea while 3.4% had acute diarrhea. The prevalence of intestinal parasites in patients with chronic diarrhea was significantly higher than in acute diarrhea (p< 0.05). Non-opportunistic intestinal parasite infections such as *Ascaris lumbricoides*, *Taenia* spp., and hookworm were commonly found, regardless of immune status or diarrheal symptoms. Opportunistic and non-opportunistic intestinal parasitic infection were more frequent in patients with a CD4 count of <200/mm³ (OR=9.5; 95% CI: 4.64-19.47) when compared with patients with CD4 counts of ≥500 cells/mm³.

**Conclusions**: Intestinal parasitic infections should be suspected in HIV/AIDS-infected patients with advanced disease presenting with chronic diarrhea. Patients with low CD4 counts should be examined critically for intestinal parasites, regardless of diarrheal status.

**Key words**: CD4, HIV/AIDS, intestinal parasite, opportunistic parasite

Tigist Bacha¹, *Birkneh Tilahun¹ and Alemayehu Worku², 2012. Predictors of treatment failure and time to detection and switching in HIV-infected Ethiopian children receiving first line anti-retroviral therapy, BMC Infectious Diseases, 12:197

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**Abstract**

**Background**: The emergence of resistance to first line antiretroviral therapy (ART) regimen leads to the need for more expensive and less tolerable second line drugs. Hence, it is essential to identify and address factors associated with an increased probability of first line ART regimen failure. The objective of this article is to report on the predictors of first line ART regimen failure, the detection rate of ART regime failure, and the delay in switching to second line ART drugs.

**Methods**: A retrospective cohort study was conducted from 2005 to 2011. All HIV infected children under the age of 15 who took first line ART for at least six months at the four major hospitals of Addis Ababa,
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Ethiopia were included. Data were collected, entered and analyzed using Epi info/ENA version 3.5.1 and SPSS version 16. The Cox proportional-hazard model was used to assess the predictors of first line ART failure.

**Results:** Data of 1186 children were analyzed. Five hundred seventy seven (48.8%) were males with a mean age of 6.22 (SD = 3.10) years. Of the 167(14.1%) children who had treatment failure, 70 (5.9%) had only clinical failure, 79 (6.7%) had only immunologic failure, and 18 (1.5%) had both clinical and immunologic failure. Patients who had height for age in the third percentile or less at initiation of ART were found to have higher probability of ART treatment failure [Adjusted Hazard Ratio (AHR), 3.25 95% CI, 1.00-10.58]. Patients who were less than three years old [AHR, 1.85 95% CI, 1.24-2.76], chronic diarrhea after initiation of antiretroviral treatment [AHR, 3.44 95% CI, 1.37-8.62], ART drug substitution [AHR, 1.70 95% CI, 1.05-2.73] and base line CD4 count below 50 cells/mm3 [AHR, 2.30 95% CI, 1.28-4.14] were also found to be at higher risk of treatment failure. Of all the 167 first line ART failure cases, only 24 (14.4%) were switched to second line ART with a mean delay of 24 (SD = 11.67 ) months. The remaining 143 (85.6%) cases were diagnosed to have treatment failure retrospectively by the authors based on their records. Hence, they were not detected and these patients were not offered second line ARTs.

**Conclusions:** Having chronic malnutrition, low CD4 at base line, chronic diarrhea after initiation of first line ART, substitution of ART drugs and age less than 3 years old were found to be independent predictors of first line ART failure in children. Most of the first line ART failure cases were not detected early and those that were detected were not switched to second line drugs in a timely fashion. Children with the above risk factors should be closely monitored for a timely switch to second line highly active anti-retroviral therapy.

**Key words:** HIV/AIDS, Immunological, Clinical, Predictors, Treatment failure, Delay, Switching, Ethiopia

**Wayu Abraham¹ and *Yifru Berhan¹, 2014. Predictors of labor abnormalities in University hospital: unmatched case control study, BMC Pregnancy and Childbirth, 14: 256**

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**Abstract**

**Background:** Abnormal labor is one of the common emergency obstetric problems contributing for more than two-thirds of the unplanned cesarean section. In Ethiopia, although labor abnormality and its complications like obstetric fistula are highly prevalent, there is no published study that determines the predictors of labor abnormalities.

**Methods:** The study design was an unmatched case control which included 844 women (408 cases and 436 controls). Cases were identified when a woman was diagnosed to have one of the labor abnormalities at term (prolonged latent stage, active phase disorder, prolonged second stage, descent disorder and obstructed labor). Subgroup logistic regression analyses were done taking the different type of labor abnormalities as the dependent variable.

**Results:** Nearly half of the cases (48.6%) were found to have the active phase disorder. Obstructed labor alone accounted for about 16.8% of the cases. The mean gestational age of cases and controls was almost comparable. More than a quarter of cases and controls came to the hospital in the second stage of labor. More than two-thirds of the cases (67.4%) gave birth by cesarean section. The logistic regression analysis demonstrated an independent association of overall labor abnormality with pelvic inadequacy. The subgroup analysis, however, revealed that several obstetric factors were associated with one or more types of labor abnormalities.

**Conclusion:** Active phase disorders were the commonest type of labor abnormalities. Cases were late in reporting to the hospital. Malposition, inadequate pelvis and inadequate uterine contraction were some of the predictors of specific types of labor abnormalities.

**Keywords:** Case control, Labor abnormality, Ethiopia

*Yared Merid¹, Yassin M.A², Yamuah L², Kumar R², Engers H², and Aseffa A², 2009. Validation of bleach-treated smears for the diagnosis of pulmonary tuberculosis, Int J Tuberc Lung Dis., 13(1): 136-141

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Summary

Setting: Health centres in Awassa, southern Ethiopia.

Design: Consecutive patients visiting health centre laboratories for the evaluation of suspected pulmonary tuberculosis (TB) between June and September 2006 were investigated. On-the-spot, morning and second on-the-spot sputum samples were pooled for each patient. Direct smears were stained with hot Ziehl-Neelsen (ZN) technique and aliquots cultured for mycobacteria on Löwenstein-Jensen media. The remaining sputum was treated with household bleach, aliquoted and processed with short-term digestion, centrifugation and sedimentation techniques, and stained with ZN.

Results: Acid-fast bacilli were detected in respectively 126 (25%), 141 (28%), 169 (34%) and 198 (40%) of the 497 pooled sputum samples processed by the direct, short-term, sedimentation and centrifugation techniques ($P<0.001$). The sensitivity of the direct, short-term, sedimentation and centrifugation techniques was respectively 51.1%, 53.2%, 57.6% and 63.6%. The difference between the direct smear and centrifugation ($P<0.001$) or sedimentation ($P<0.005$) methods was significant. The specificity of the direct, short-term digestion, sedimentation and centrifugation techniques was respectively 97%, 93%, 86.5% and 80.8%.

Conclusions: Bleach treatment of sputum and centrifugation significantly improves the sensitivity of smear microscopy for the diagnosis of TB in a health centre in a high TB burden area. It is more sensitive, but possibly less specific, than other bleach methods.

Key words: Acid-fast bacilli, microscopy, bleach, pooled sputum validation


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Abstract

Background: The habit of raw fish eating is common among fishermen and people around lakes. Thus periodic assessment to determine fish tapeworm and helminthic infection is important.

Objective: To determine the presence of fish tape worm and other helminthic parasites.

Methods: A cross sectional coproparasitologic study was conducted during the month of November, 1998 among 150 children under the age of 15 engaged in fishing, and fish processing in Awassa Southern Ethiopia. All study subjects were screened for fish tape worm and other intestinal helminthic infections. Stool samples were examined microscopically using direct smear, Formol ether concentration and Zinc Sulphate flotation techniques.

Results: The over all prevalence for at least one helminth infection was 92.7%. The most prevalent parasites were A. lumbricoides (76%), Hook worm species (62.5%) T. trichuria (60%) and S. mansoni (33%). Three cases of Heterophid infections transmitted by eating raw fish were also recorded.

Conclusion: The public health implication of intestinal parasites among the study groups is discussed and necessary recommendations are suggested.


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Abstract

Background: During cesarean delivery, extracting a deeply impacted head is a real challenge for obstetricians.
Objectives: To compare selected maternal and fetal outcome indicators of the “pull” (reverse breech extraction) and “push” methods for impacted fetal head extraction during cesarean delivery. Search strategy: A computer based search of the Medline, Cochrane library, and HINARI databases. Selection criteria: Studies that compared the maternal and perinatal outcomes of the push and pull methods for impacted fetal head extraction during cesarean delivery were included. Data collection and analysis: A meta-analysis of Mantel–Haenszel odds ratios and standardized mean differences from 11 randomized comparative and retrospective cohort studies was performed.

Main results: In the pooled analysis, the risk of uterine incision extension was more than 8 times higher with the push method than with the pull method. Blood loss and operation time were also increased with the push method, and this method was associated with more perinatal deaths and admissions to the neonatal intensive care unit. The risk of wound infection was not significantly different between the 2 methods.

Conclusions: The present meta-analysis demonstrated marked reductions in uterine incision extension, blood loss, and operation time with reverse breech extraction.

Keywords: Cesarean delivery, Impacted fetal head, Meta-analysis, Push method, Reverse breech extraction


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Abstract: A cross-sectional study design was used to assess sexual-risk behaviour and HIV-preventive practices among students at Hawassa University, Ethiopia, in 2009. Among 1 220 students eligible for the study, approximately 29% reported experience of sex (36.3% of the males and 9.3% of the females). Of the total sexually active respondents, 67.1% had begun sexual activity while still in secondary school. For the previous 12-month period, 42.1% said they did not use condoms during the last sexual encounter, 46.1% of the males claimed having had sex with ‘bar ladies,’ and 39% said they had an active symptom of a sexually transmitted infection (STI). Logistic regression analysis demonstrated a significant association of higher-risk sexual practices in the previous year with being female and having an income greater than US$30/month. Having multiple sexual partners was strongly associated with being female, having a monthly income greater than US$30, a sexual debut before age 18 and before attending university, ever having had sex for the sake of money, active STI symptoms, and attending nightclubs. Overall, the students reported sexual practices that were considerably unprotected; we surmise that this likely exposed approximately two-fifths to STIs and nearly 10% to unplanned pregnancy. We conclude that to alter university students’ sexual-risk behaviour, a great deal of relevant intervention should be carried out during earlier school years, and the observed link between a greater frequency of sexual-risk behaviour and higher income needs to be investigated.

Key words: condoms, East Africa, multiple sexual partners, prevention, sexual debut, sexually transmitted infections, young, adults

*Yifru Berhan, 2013. Postpartum cervical prolapses preceded by precipitated labour, Arch Gynecol Obstet 287:171–174

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Introduction: Precipitated labour is diagnosed when the total duration of labour takes less than 3 h [1–3]. Although the exact prevalence of precipitated labour is not known, it is estimated to be about 2% of the total deliveries [4, 5]. Precipitated labour is known to risk the baby for birth injuries, and the mother to genital lacerations and postpartum haemorrhage [3, 6, 7]. A comparative study had shown that placental abruption, fertility treatments, chronic hypertension, intrauterine growth restriction, prostaglandin E2 induction, birth weight <2,500 g and nulliparity were independent risk factors for precipitated labor [8]. In another study, precipitated labour was found to be associated with placental abruption, uterine tachysystole, and recent maternal cocaine use [9]. Why labor progress precipitated in somewomen is not exactly known? Abnormally strong uterine contraction and loose resistance of the soft tissues of the birth canal were some of the attributed factors [3, 7]. However, most authors pointed out that precipitated labour is not well studied [2, 3,
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In literature, cervical prolapse complicated by precipitated labour was not reported. Three cases of immediate postpartum cervical prolapses preceded by precipitated labour are presented.


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**Abstract**
**Background:** A number of epidemiological studies have addressed the issue of HIV/AIDS in Ethiopia. However, to the best of author’s knowledge, little has been done to explore people living with HIV/AIDS (PLWHAs’) attitude towards childbearing, knowledge on mother to child HIV transmission (MTCT) reduction methods.

**Objective:** To assess PLWHAs’ attitude towards being a biological parent in the future and their knowledge on MTCT of HIV reduction methods.

**Methods:** A cross sectional study design was used to conduct quantitative and qualitative study in three public hospitals among PLWHAs on antiretroviral therapy. Systematic sampling for quantitative, and non-probability sampling for qualitative study was applied to select 507 and 32 research participants, respectively.

**Result:** In general, 41.0% of quantitative study participants had desire to be a biological parent in the future (54.2% of men and 31.6% of women) (P< 0.0001). A smaller proportion of HIV-infected women desire children in the future than men, primarily due to fear of deterioration of healthiness due to pregnancy. Study participants assumed that pregnancy speed up HIV disease progression and it is cited as one of the major deterrent for lack of childbearing desire. Nearly three-fourths (72.4%) of respondents overestimated the risk of MTCT of HIV (P< 0.0001). There is very little knowledge on significance of operative delivery to reduce MTCT of HIV. About two-fifths (59.0%) of the study sample had knowledge on two methods of reduction of MTCT of HIV (P< 0.005).

**Conclusion:** Pregnancy decision-making is found to be a challenge for PLWHAs primarily due to fear of potential health risk to the mother, vertical transmission of HIV to the baby, incapacitated economic status and the psychological trauma HIV incurred on them.


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**Abstract**
**Background:** Despite the high prevalence of polysubstance use in low income countries, little has been done to investigate the linkage between polysubstance use and risky sexual behaviors.

**Objective:** To assess the association of polysubstance use with risky sexual behaviors, economic, educational and geographic factors.

**Methods:** A cross-sectional study on aspects of risky behavior towards HIV-infection was conducted on a sample of 1220 university students. Logistic regression analysis was applied to examine the linkage between polysubstance use and risky sexual behavior - having sex with multiple partners, commercial sex workers and failure to use condom.

**Results:** About one fourth of study participants reported to use one or more types of substance (mainly cigarette, alcohol and khat) in one year period. Of these students, more than three-fifths started using the substance before joining university and more than two-fifths were polysubstance users. Students from urban areas were more likely to be polysubstance users and to engage in sexual practice. Logistic regression analysis demonstrated a strong association of polysubstance use with male gender, being born and growing up in urban areas, good income, taught in private school, academically senior and born to more educated parents (P< 0.05 each). The majority (42%) of polysubstance users was also practicing sex with multiple partners and commercial sex workers; had sex without condoms and developed active sexually transmitted infection (STI) symptoms (P< 0.0001 for each).

**Conclusion:** This analysis unveils the strong association of polysubstance use with better socioeconomic
circumstances, better education and risky sexual behaviors. Primary prevention strategies should target students in elementary and secondary schools, mainly in the urban setting, and preferably by involving their parents.

**Key words**: Income, risky sex, student, polysubstance use, urban.


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**Abstract**: A retrospective cohort study design was used to assess predictors of perinatal mortality in women with placenta previa and abruption between January 2006 and December 2011. Four hundred thirty two women (253 with placenta previa and 179 with placental abruption) were eligible for analysis. Binary logistic regression, Kaplan-Meier survival curve and receiver operating characteristic (ROC) curve were used. On admission, 77% of the women were anaemic (< 12 gm/dl) with mean haemoglobin level of 9.0 ± 3.0 gm/dl. The proportion of overall severe anaemia increased from about 28% on admission to 41% at discharge. There were 50% perinatal deaths (neonatal deaths of less than seven days of age and fetal deaths after 28 weeks of gestation). In the adjusted odds ratios, lengthy delay in accessing hospital care, prematurity, anaemia in the mothers, and male foetuses were independent predictors of perinatal mortality. The haemoglobin level at admission was more sensitive and more specific than prematurity in the prediction of perinatal mortality. The proportion of severe anaemia and perinatal mortality was probably one of the highest in the world.

**Key words**: Anaemia, delay, Ethiopia, logistic regression, prematurity.


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**Abstract**

**Background**: In HIV-infected children, assessment of liver and renal functions, growth pattern, hematologic and immunologic profiles is highly recommended. However, no study has evaluated the regularity of these kinds of assessment in hospital population.

**Objective**: The objective of this study was to evaluate the regularity of selected hematological, biochemical and anthropometric monitoring.

**Methods**: A Multi-Centre Retrospective Cohort Study was done to analyze 1163 HIV-infected children who had follow up in seven public hospitals in Ethiopia. The frequency of the following measures was used as a proxy indicator of the quality of assessment: weight and height measurement, absolute CD4 count, haemoglobin level and Serum glutamic oxaloacetic transaminase (SGOT). Paired sample t-test was done to evaluate the change in weight, haemoglobin and SGOT levels.

**Results**: Initially, for all children CD4 and haemoglobin levels were assessed. At 6 and 24 months after start of ART, the proportion of children with a CD4 assessment was 68% and 37%, respectively; 55% and 28% for haemoglobin; 62.7% and 6.4% for weight; and, 47% and 23% for SGOT. Mean weight for children age ten years and above, and mean height for children age two years and above was below the 5th percentile. Initially and at 24 months, the prevalence of all types of anemia was about 50% and 7%, respectively. There were no children with severe hepatotoxicity.

**Conclusion**: The proportion of children being assessed for CD4, haemoglobin, SGOT and weight measures were initially two-third and markedly declined as the cohort progressed. The prevalence of anemia after two years follow up reduced by about 8-fold, growth appears to be poor in older children while hepatotoxicity is observed to be a rare phenomenon.

**Key words**: HIV-infected children, weight, haemoglobin, liver transaminase, ART.
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Abstract

**Background:** Although the practice of western medicine in Ethiopia dates back to the time of King Libne Dengel (1520-1535), organized and sustainable modern medical practice started after the battle of Adwa (1896).

**Objective:** To review hospitals construction, medical doctors production and attrition, and to suggest alternative medical doctors retention mechanisms in the public sector and production scale up options.

**Methods and materials:** In this article, 100 years Ethiopian modern medical history is revised from old and recent medical chronicles. Until December 2006 primary data was collected from 87 public hospitals. Much emphasis is given to medical doctors profile (1906 –2006), hospitals profile (1906–2005), medical doctors to population and hospitals ratio (1965-2006), Ethiopian public medical schools 42 years attainment (1964-2006), annual attrition rate (1984-2006), organizational structure of medical faculties & university hospitals, medical doctors remuneration by the Ministry of Health (MOH), Ministry of Education (MOE), NGOs and private health institutions. This article also addresses the way forward from physician training and retention perspectives, multiple alternate mechanisms to increase physicians’ motivation to work in government institutions and revere the loss. Medical doctors production scale up option is also given much emphasis. Most data are presented using line and bar graphs.

**Results:** Literature review showed that the first three hospitals were constructed in 1896 (Russian hospital), 1903 (Harar Ras Mekonnen hospital) and 1906 (Menelik II hospital). In 2005, 139 hospitals (87 public and 52 others) were reported. Remarkable hospital construction was done between 1935 and 1948, and recently between 1995 and 2005; however, in the latter case, private hospitals construction took the lions share. By the time MOH was established (1948), 110 Ethiopian and expatriate medical doctors were working, mainly in the capital, and 46 hospitals constructed. Physician number increment was very slow till 1980 at which time it started to get doubled every five years and reached peak (1658 medical doctors of all type) in 1989 in the public sector. As there was sharp increment in physician number, on the contrary, there was sharp decline in the last 15 years (1990–2006) to nadir 638 doctors in 2006 in the public sector. The last 25 years of Ethiopian modern medical history, in reference to physician number, forms a triangle with the lower and upper base 1980 and 2006, respectively. Since MOH of Ethiopia started registering health professionals with qualifications in 1987, 5743 (76.5% Ethiopian and 23.5% expatriate) medical doctors were registered for the first time. Out of these, 3717 were general practitioners. The three prestigious medical schools (Addis Ababa, Gondar, Jimma) were established in 1964, 1978 and 1984, respectively. Since establishment till 2006, about 3728 medical doctors were graduated with M.D degree from the three medical schools. Addis Ababa university medical faculty alone graduated 1890 general practitioners (1964-2006) and 862 clinical specialists (1979 – 2006). In the 23 years period (1984-2006), the highest and lowest physician to population ratios in the public sector were found to be in 1989 (1:28,000) and 2006 (1:118,000), respectively. In 2006, the physician to population ratio in Amhara, Oromia and SNNPR regional states was computed to be 1:280,000, 1:220,000, and 1:230,000, respectively. The physician deficit analysis in the last 23 years in relation to the WHO standard for developing countries (1:10,000) revealed the lowest record at the national and regional states in the last 12-years. Average physician to hospital ratio in five regional states in December 2006 was 3.6 (Tigray), 4.3 (Amhara), 6.1 (Oromia) and 5.3 (SNNPR). As the December 2006 direct interview with 76 public


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Abstract

**Background:** Although antiretroviral treatment (ART) programmes began in 2003 in Ethiopia, there is scarcity of information about paediatric ART.

**Objective:** The purpose of this study was to describe the changes in absolute CD4 counts among children on ART

**Methods:** A multicenter retrospective cohort assessment was applied to analyze 336 HIV-infected
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children who were under 15 years old and on ART (September 2006 - March 2009) using a sample database from seven public hospitals in different regions.

**Results:** The mean age at the time of ART commencement of the cohort were 5.9 +/- 3.2 years. Median follow-up of the cohort was 12 (Inter quartile range 6 to 18) months. The overall absolute CD4 count change showed an increasing trend from the baseline in all age categories. At age 5 years and above, the baseline CD4 count was very low but the increment was very high up to 12 months. The mean absolute CD4 count change in relation to the duration of ART showed an increasing trend up to 12 months and declined after 18 and 24 months. Severe immunosuppression (SI) at initiation of ART (P < 0.0001; Adjusted OR, 5.3) and age 3-4.9 years were independent predictors of continuing SI up to 6 months. Only SI at 6 months was independently associated with SI at 12 months (P < 0.0001; AOR, 21.4).

**Conclusion:** The majority of children have CD4 count rise after ART and that the slope of rise was greater in older children in the first 12 months of therapy.


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**Abstract:** A review of the literature has revealed that data on HIV-infected clinical presentations, age at the time of diagnosis and level of immunosuppression in resource-poor settings are very limited. A multicenter retrospective and cross-sectional method was used to analyze 1163 children <15 years of age. More than half of the children were >5 years of age (mean ± SD age 4.9 ± 3.2). About 54% of children were symptomatic. Tuberculosis and chronic dermatologic disorders were the commonest co-infections. The severity of immunosuppression was highest in preschool children (46.6%) and early adolescents (41.3%). After adjustment for sex, age, pattern of feeding and hemoglobin level, multinomial logistic regression showed that CD4 count 200-499, 500-999 and Tigray ethnicity were independently associated with being symptomatic. More than one-third of the children were in a state of severe immunosuppression and more than half were immunologically eligible for antiretroviral treatment.


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**Abstract**

**Background:** The effect of Bishop Score on labour induction outcome is extensively studied and partly known. However, the length of induction before failed induction declared is a controversial issue. Furthermore, to our knowledge, stratified Bishop Score in relation with stratified mode of delivery, induction initiation to vaginal delivery time, and variable cervical dilatation change among failed inductions were not assessed before. In literature, the maximum oxytocin in milliunit/minute also does vary from 20 to 42 milliunit/minute. Lack of published study assessing the separate oxytocin dose regimen for nulliparas and multiparas in Ethiopia, for which we could not find such regimen in literature, motivated us to review a two year case-series at term and post term.

**Objective:** To evaluate the relation of Bishop Score and induction outcome measured by length of induction initiation-vaginal delivery time and modes of delivery in Gandhi and St. Paul's hospitals.

**Methods:** Time lapsed to deliver vaginally or to declare failed induction, the maximum oxytocin level in milliunit/minute also does vary from 20 to 42 milliunit/minute. Lack of published study assessing the separate oxytocin dose regimen for nulliparas and multiparas in Ethiopia, for which we could not find such regimen in literature, motivated us to review a two year case-series at term and post term.

**Result:** The Bishop score of 42.0% and 42.4% of the 552 women medically induced were assessed to have 0-5 and 6-8, respectively. Over all, among the 0-5 Bishop Score group, 45.7% were induction failures. To be specific, out of 157 total failures, 0-5 Bishop Score group accounted for 67.5% (P < 0.0001). Bishop score was found to have an inverse relation with failed induction, and negative correlation (r = -0.22) with length of labour among vaginal deliveries. Failure to bring about cervical dilatation and unable to establish adequate uterine contractions (45.2% and 54.8%, respectively) were the two reasons for failed inductions. Although the range was wide (2:50 - 21:0), the mean length of induction in hours in both nulliparas and multiparas
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prior to decision for failed induction was comparable (9:45 +/- 3:20 vs 9:25 +/- 2:55). The maximum oxytocin infused in mu/min for nulliparas and multiparas was 73.4 and 36.7 but was not linear; stepwise increase with each increase in the infusion rate was not the finding.


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Abstract

Introduction: Although induction of labour with oxytocin is a daily practice at public as well as private health institutions, to the best of our knowledge, there is no published study on induction in Ethiopia.

Objective: To assess the oxytocin dose required to achieve adequate uterine contraction, the time interval between initiation of oxytocin and adequate contraction achieved and the time lapsed between initiation of induction and vaginal delivery.

Methodology: A two-year retrospective case-series study was done to evaluate the currently used oxytocin regimen outcome measures at Gandhi and St. Paul's hospitals. Oxytocin level in milliunit/minute to achieve adequate uterine contraction, time lapsed to establish labour and deliver vaginally, Bishop Score, and indications for induction were some of the variables included.

Results: Five hundred fifty two women induced at term and post term (55.8% nulliparas and 44.2% multiparas) were reviewed with overall elective to emergency induction ratio about 1:1. The first three indications for induction were post term (P< 0.05), term premature rupture of fetal membranes and hypertension (P=0.005). Spontaneous vertex delivery (46.4%), caesarean section for failed induction (28.4%) and fetal distress (9.6%) were the top modes of delivery in both nulliparas and multiparas. Equal proportion of nulliparas and multiparas established labour (84.1% vs 84.8%) with mean oxytocin level in mu/min 33.6 +/- 21.9 and 17.2 +/- 11.4 and mean time lapsed in hours 2:10 +/- 1:30 and 2:10 +/- 1:10 between initiation of induction and adequate uterine contraction, respectively. More than two-thirds of multiparous and half of nulliparous women achieved adequate uterine contractions with 20-mu/min and less oxytocin infusion among the total women (84.4%) who were diagnosed to have adequate uterine contractions.

Conclusion: Although the starting, increment and maximum oxytocin regimen for nulliparas and multiparas were different but with parallel Bishop Score, the induction initiation to vaginal delivery time was almost comparable. Very high oxytocin dose for nulliparas wasn’t superior to multiparas dose.


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Abstract: About half a century passed since synthetic oxytocin use to induce or augment labour came in to clinical practice; however, so far there is no international consensus on the dose regimen. In most studies, high dose regimen and long increment interval were found to have much desirable obstetric outcomes (short induction-to-delivery time, low caesarean section rate, less fetal and maternal risk). Although different centres use different starting and increment dose regimen, the stepwise increment till the maximum dose achieved (20 mu/min for low-dose and 42 mu/ min for high dose regimen) is the common feature. The oxytocin regimen practiced in Ethiopia is unique: different regimen is used for nulliparas and multiparas; half dose of induction is for augmentation; the maximum dose achieved at the middle of the cycle is nearly twice (74.3-85.4 mu/min) the maximum dose other centres use (42 mu/ min). Dose increment is also so bizarre and swinging. The maximum dose achieved at the middle of the three cycles is not maintained In general, to the best of author's accessible resources, the origin of this regimen is not clear and cannot be traced to any scientific literature. Therefore, easily applicable regimen for Ethiopian set up is presented for clinical trail.


¹Hawassa University, Medical Faculty, P.O. Box 1560, Hawassa, Ethiopia. (*yifrub@yahoo.com)
Abstract

**Background:** In Ethiopia, in the previous studies, the rates of perinatal and maternal mortality were reported as one of the highest in the world. Objective: The purpose of the study was to analyze the rates of variables-specific perinatal deaths, maternal and perinatal case fatality rates and to determine common indications of operative deliveries with their outcome indicators.

**Method:** A retrospective one-year medical record review of major emergency obstetric performance was conducted in Tikur Anbessa specialized hospital.

**Result:** During the study period, 3897 women with pregnancy related problems were admitted and managed as an emergency cases: 92% with gestational age of 28 weeks & above, 5.8% abortion, 2.0% ectopic pregnancy and 0.2% gestational trophoblastic disease. The 3583 women gave birth to 3672 babies, of which, 337 were perinatal deaths, making the gross perinatal and early neonatal mortality rates 91.8 and 26.1/1000 births each, respectively. The three leading causes of perinatal mortality were malpresentation (13.1%), uterine rupture (12.5%) and obstructed labor (11.9%), with obstructed labor and eclampsia the highest case-fatality rates (86.9-100% and 72.7%, respectively). The maternal mortality ratio was 1107.5/100,000 live births and the top three-implicated causes were postabortal complications (28.9%), eclampsia (21.1%) and ruptured uterus (15.8%). Operative (abdominal or vaginal) deliveries were performed for 43.1% babies. Fetal distress was the commonest indication for operative deliveries (32.5%) as well as the commonest cause of low Apgar scores at the 1st minute (61.4%).

**Conclusion:** Three-fourths of the total perinatal deaths were stillbirths, 94.2% referred. About half (48.9%) of the total causes of perinatal deaths were mechanical factors, predominantly obstructed labor that could have been totally averted if the system of basic obstetric care was properly established. Preventable obstetric complications such as abortion, eclampsia and uterine rupture are still the foremost causes of maternal deaths.


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Abstract

**Background:** Extracranial hemorrhage is one of the complications of instrumental delivery associated with increased risk of mortality. Absence of published data in Ethiopia on this issue was the motivation for this study.

**Objective:** The objective of this study is to review extracranial hemorrhage cases (cephalhematoma and subgaleal hemorrhage) and outcomes of treatment.

**Methods:** A retrospective record review of extracranial hemorrhage case series admitted to the neonatal unit between January 1993 and December 2002 was undertaken. Antepartum and intrapartum history, neonatal problems developed due to extracranial hemorrhage, progress evaluated by clinical, laboratory and anthropometric indicators and the final outcomes were analyzed.

**Results:** A total of 701 cases of extracranial hemorrhage were registered during the study period. Of which, 76.6% were subgaleal hemorrhage and 24.4% were cephalhematom a with 74 and 15 deaths, respectively. Instrumental delivery or attempts alone accounted for 71.5% of subgaleal hemorrhage cases. In contrast, more cases of cephalhematoma were found in spontaneous vertex delivery, breech delivery, health center and home deliveries. The severity of blood loss in subgaleal hemorrhage was marked by causing 81.9% cases of severe anemia, of which 106 being found in hemorrhagic shock and 87.9% above 90th percentile head circumferences.

**Conclusion:** Although instrumental delivery or attempt was dominant on the occurrence of subgaleal hemorrhage, there was no mode of delivery safe for extracranial hemorrhage. Cephalhematoma was not always benign as reported in literature. Hemorrhagic shock was the commonest cause of death in both subgaleal hemorrhage and cephalhematoma. The choice and application of instrumental delivery are areas of further investigation.


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Abstract: Some of the fascinating developmental anomalies encountered by Obstetricians and Gynecologists are Mullerian duct disorder of various types. The diagnosis is usually made during workup for infertility, recurrent pregnancy loss or cyclic pelvic pain. Because of embryologic developmental structural share and proximity, it is not uncommon to find Mullerian duct, urinary tract and skeletal anomalies concurrently. Three parous women with different Mullerian duct malformations preoperatively diagnosed as ovarian tumor, ectopic pregnancy and footling breech are reported. Intraoperatively, the first case was found to have uterine didelphys with blind hemivagina, lumbosacral bone defect and hypoplastic pelvic kidney. In the second case, bicornuate uterus with viable pregnancy and in the third case, fetus and placenta in separate cavity of partially septated uterus were identified. Literature on the embryologic association of mesonephric and paramesonephric ducts anomaly, the reproductive outcome and place of metroplasic surgery are reviewed.


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Abstract: True hermaphrodite is one of the rare gonadal as well as genital abnormality due to a defect in sexual differentiation. Here, we are reporting the most unusual type of true hermaphrodite diagnosed at the age of 25 years during operation for undescended testis, presenting as a case of infertility and failure to ejaculate during sexual intercourse. The patient was found to have grossly as well as histologically proven left ovary, left fallopian tube and uterus as well as a well descended left testis, with totally absent either right fallopian tube and ovary or testis. Thus, this is unusual finding to ratify the occurrence of true hermaphrodite in the absence of ambiguous external genitalia.


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Abstract: Holoprosencephaly is one of the rare types of craniofacial congenital anomaly characterized by failure of differentiation of the procencephalon to diencephalon and telencephalon derivatives that accompanied by variable degree of orbitofacial dysmorphism. The case presented to our hospital in the third trimester of pregnancy with intrauterine fetal death was diagnosed prior to delivery as hydrocephalus to rule out hydrops fetalis. Autopsy examination showed distinctive features of holoprosencephaly of severe type in conjunction with a large head fused with the thorax to appear as a spherical ball ('cephalothorax' nature) and multiple cardiac malformations but with normally differentiated upper and lower limbs, intestines, female reproductive system and kidneys. We are reporting this unusual case to remind clinicians to be conscious on partly preventable teratogens specific to this anomaly, and if failed to do so, to diagnose as early as possible and terminate the pregnancy through vaginal route, within all the provision of the law.


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Abstract: Premature ovarian failure in the early age 20s is a very rare phenomenon. In a woman presenting with amenorrhea and symptoms of hypoestrogenism, the confirmatory diagnosis of premature ovarian failure relies upon the finding of postmenopausal level of the follicle-stimulating hormone (FSH > 40 mIU/ml). Three women at the age of 25, 30 and 32 years presented with 5, 6 and 10 years secondary amenorrhea, respectively. They used to have regular menses, and two of them gave birth to a healthy baby(ies). Although the etiology remains enigmatic, their gonadotropin and estradiol serum values were found to be in the postmenopausal range. Serum FSH values in the three cases were 135.4, 41.9 and 86.5 mIU/ml. Both combined oral contraceptive pills and progesterone challenge test were administered but couldn't bring about recommencement of menstrual flow. These three women who were diagnosed as a case of premature ovarian
failure, evidenced by long standing secondary amenorrhea, secondary infertility, signs and symptoms of postmenopause and biochemical evidences of hypergonadotropic hypoestrogenism, were put on continuous combined oral contraceptive pills and felt better. Literature on the potential serious complications of premature menopause and treatment options in low setting areas is revised.


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Abstract: Although bloody traditional procedures are very common in Ethiopia, this is the first report on infants. None of the literature attributed such practices as risk factor for mother-to-child transmission (MTCT) of HIV. Analysis was done to 1,163 children and found that 552 (47.5%) bloody traditional procedures were performed in the oral cavity to 399 (34.3%): uvulectomy 41.8%, milk tooth extraction 33.7% and tonsillectomy 24.5%. Multinomial logistic regression showed strong association of uvulectomy with Tigray ethnicity. Milk teeth extractions were highest among girls, rural residence, Tigray and Amhara ethnicity. When procedures performed, children were under 1 month (88.9% of tonsillectomies), under 6 months (83.5% of uvulectomies) and 4-6 months (54.3% of milk tooth extractions) of age. More than 97% for whom procedures performed were breast fed, and about 88% were from the northern part of the country. Taking into account the deep invasiveness of the procedures, they are assumed as one of the strong risk factors for MTCT of HIV during lactation.

Key words: Uvulectomy, Tonsillectomy, Milk tooth extraction, MTCT of HIV, Infancy

*Yifru Berhan¹ and Asres Berhan¹, 2013. Meta-analyses of fertility desires of people living with HIV, BMC Public Health, 13: 409

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Abstract

Background: Literature review has shown that some years back the fertility desires of people living with HIV was low but in the recent years, it was reported as increasing. However, little is known about the strength of association of fertility desire of HIV positive people with antiretroviral therapy (ART) experience, age, sex, education level, and number of children.

Methods: In these meta-analyses, twenty studies from different parts of the world were included. The odds ratios of fertility desires were determined using the random-effects model. Heterogeneity among the studies was assessed by computing values for Tau2, Chi-square (Q), I² and P-value. Sensitivity analysis and funnel plot were done to assess the stability of pooled values to outliers and publication bias, respectively.

Results: The pooled analysis demonstrated that fertility desires of study participants had no association with ART. Similarly, the overall odds ratio did not show statistically significant association of fertility desires with sex and educational attainment of study participants although forest plots of some studies fall on increased and some others on decreased sides of fertility desires. The two variables that demonstrated a strong association with fertility desires were age less than 30 years and being childless. The lowest heterogeneity was found in a meta-analysis comparing ART experienced and ART naïve HIV positive people. In all meta-analyses, the sensitivity analyses showed the stability of the pooled odds ratios; and the funnel plots did not show publication or disclosure bias.

Conclusion: Although the fertility desires among childless and younger age group was very strong, we realized that quite a significant segment of HIV-infected people have desire for fertility. Therefore, including fertility issue as integral part of HIV patient care may help several of them in their reproductive decision making (letting them know the risks and methods of prevention while anticipating pregnancy).

Key words: ART, Fertility desire, Meta-analysis, HIV positive, Sensitivity analysis
Academic Success Depends on Research and Publications

*Yifru Berhan¹ and Asres Berhan¹, 2013. Meta-analysis on risky sexual behaviour of men: Consistent findings from different parts of the world. *AIDS Care*, 25(2): 151-9

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**Abstract**: The aim of this analysis was to determine the consistency of higher-risk sex practice among educated and/or wealthy men in different parts of the world. Meta-analysis was done on risky sexual behaviour of men using the recent Demographic and Health Surveys (DHS 2003-2009) data from 26 countries in and outside Africa. DHS data were accessed through electronic databases. In this analysis, since there was significant heterogeneity ($I^2 > 50\%$) among surveys findings, random effects analytic model was applied. Mantel-Haenszel statistical method was used to calculate the pooled odds ratios across countries. Out of 79,736 men aged 15-49 years who had sexual intercourse in 12 months preceding the respective survey, 35.7% reported to have higher-risk sex. The proportion of higher-risk sex was found positively correlated with increased wealth index. In 24 countries, higher risk sex was found to have highly statistically significant association with men living in urban areas, educated to secondary and above, and owned middle to highest wealth index. The overall condom use during the last higher risk sexual encounter was 47% but condom use was better practiced by educated men. Nearly in two-thirds of countries reported HIV-prevalence, the proportion of HIV infection was highest among better educated. In conclusion, this meta-analysis has shown that risk taking sexual behaviour is invariably associated with high educational attainment, urban residence and better wealth index regardless of geographic location of men participated in the surveys.

**Key words**: Education, higher-risk sex, residence, wealth, condom, HIV-prevalence


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**Abstract**

**Background**: The development of tipranavir and darunavir, second generation non-peptidic HIV protease inhibitors, with marked improved resistance profiles, has opened a new perspective on the treatment of antiretroviral therapy (ART) experienced HIV patients with poor viral load control. The aim of this study was to determine the virologic response in ART experienced patients to tipranavir-ritonavir and darunavir-ritonavir based regimens.

**Methods and Findings**: A computer based literature search was conducted in the databases of HINARI (Health InterNetwork Access to Research Initiative), Medline and Cochrane library. Meta-analysis was performed by including randomized controlled studies that were conducted in ART experienced patients with plasma viral load above 1,000 copies HIV RNA/ml. The odds ratios and 95% confidence intervals (CI) for viral loads of <50 copies and <400 copies HIV RNA/ml at the end of the intervention were determined by the random effects model. Meta-regression, sensitivity analysis and funnel plots were done. The number of HIV-1 patients who were on either a tipranavir-ritonavir or darunavir-ritonavir based regimen and achieved viral load less than 50 copies HIV RNA/ml was significantly higher (overall OR = 3.4; 95% CI, 2.61–4.52) than the number of HIV-1 patients who were on investigator selected boosted comparator HIV-1 protease inhibitors (CPIs-ritonavir). Similarly, the number of patients with viral load less than 400 copies HIV RNA/ml was significantly higher in either the tipranavir-ritonavir or darunavir-ritonavir based regimen treated group (overall OR = 3.0; 95% CI, 2.15 – 4.11). Metaregression showed that the viral load reduction was independent of baseline viral load, baseline CD4 count and duration of tipranavir-ritonavir or darunavir-ritonavir based regimen.

**Conclusions**: Tipranavir and darunavir based regimens were more effective in patients who were ART experienced and had poor viral load control. Further studies are required to determine their consistent viral load suppression effect as the duration of treatment is more prolonged.
Academic Success Depends on Research and Publications


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Abstract

**Background:** In several developing countries, achieving Millennium Development Goal 4 is still off track. Multiple maternal and fetal risk factors were inconsistently attributed to the high perinatal mortality in developing countries. However, there was no meta-analysis that assessed the pooled effect of these factors on perinatal mortality. The purpose of this meta-analysis was to identify maternal and fetal factors predicting perinatal mortality.

**Methods:** In this meta-analysis, we included 23 studies that assessed perinatal mortality in relation to antenatal care, parity, mode of delivery, gestational age, birth weight and sex of the fetus. A computer based search of articles was conducted mainly in the databases of PUBMED, MEDLINE, HINARI, AJOL, Google Scholar and Cochrane Library. The overall odds ratios (OR) were determined by the random-effect model. Heterogeneity testing and sensitivity analysis were also conducted.

**Results:** The pooled analysis showed a strong association of perinatal mortality with lack of antenatal care (OR=3.2), prematurity (OR=7.9), low birth weight (OR=9.6), and marginal association with primigravidity (OR=1.5) and male sex (OR=1.2). The regression analysis also showed down-going trend lines of stillbirth and neonatal mortality rates in relation to the proportion of antenatal care. The meta-analysis showed that there was no association between mode of delivery and perinatal mortality.

**Conclusion:** The present meta-analysis indicated a significant reduction in perinatal mortality among women who attended antenatal care, gave birth to term and normal birth weight baby. However, the association of perinatal mortality with parity, mode of delivery and fetal sex needs further investigation.

**Key words:** antenatal care, developing countries, meta-analysis, perinatal mortality, skilled person attended delivery


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Abstract

**Background:** Although the perinatal mortality in low income countries is about five-folds higher than in the high income countries, little is known about the association of socio-demographic factors with perinatal mortality. National and small scale studies so far reported have shown very contradictory results. The objective of this meta-analysis was to assess the association of perinatal mortality with selected sociodemographic factors.

**Methods:** A computer based literature search was conducted mainly in the databases of african journals online, measure demographic and health survey (dhs), google scholar, hinari, pubmed, medline and the cochrane library. The inclusion criteria were: 1) studies that assessed the perinatal mortality in developing countries in relation to socio-demographic predictors and 2) studies published in english and conducted after the year 1990. Subgroup meta-analyses of perinatal mortality were performed for mothers’ age, residence, educational level and wealth status. sensitivity analysis and heterogeneity testing were done.

**Results:** In this meta-analysis, several inconsistent associations of perinatal mortality with the selected socio-demographic variables were observed in the primary studies level, both dhs and small scale studies. However, the overall odds ratio (or) demonstrated statistically significant association of perinatal mortality with low maternal age (or=1.2) and short birth interval (or=1.4) but was not influenced by the mothers’ residence, low educational level and household wealth index. very consistently, the highest perinatal mortality rates reported when the birth intervals were either too short (<15 months) or too long (>39 months).
Conclusion: Because of the disagreement among previous studies, the present study demonstrated a small effect size on the increased risk of perinatal mortality among women who were pregnant during teenage ages and gave birth too frequently or after a long interval. Therefore, to confirm the strong predictors of perinatal mortality, further studies on sociodemographic factors are needed.

Key words: Birth interval, Subgroup Meta-Analysis, Mother’s age, Education, Perinatal mortality


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Abstract

Background: The Low Proportion Of Health Facility Delivery In Developing Countries Is One Of The Main Challenges In Achieving The Millennium Development Goal Of A Global Reduction Of Maternal Deaths By 75% By 2015. There Are Several Primary Studies Which Identified Socio-Demographic And Other Predictors Of Birth In Health Facility. However, There Are No Efforts To Synthesis The Findings Of These Studies. The Objective Of This Meta-Analysis Was To Determine The Strength Of The Association Of Birth In The Health Facility With Selected Sociodemographic Factors.


Results: The Pooled Analysis Demonstrated Association Of Health Facility Delivery With Living In Urban Areas (Or = 9.8), Secondary And Above Educational Level Of The Parents (Or = 5.0), Middle To High Wealth Status (Or = 2.3) And First Time Pregnancy (Or = 2.8). The Risk Of Delivering Outside The Health Facility Was Not Significantly Associated With Maternal Age (Teenage Vs 20 Years And Above) And Marital Status. The Distance Of Pregnant Women’s Residence From The Health Facility Was Found To Have An Inverse Relation To The Proportion Of Health Facility Delivery.

Conclusion: Although The Present Meta-Analysis Identified Several Variables Which Were Associated With An Increase In Health Facility Delivery, The Most Important Predictor Of Birth In The Health Facility Amenable To Intervention Is Educational Status Of The Parents To Be. Therefore, Formal And Informal Education To Women And Family Members On The Importance Of Health Facility Delivery Needs To Be Strengthened. Improving The Wealth Status Of The Population Across The World May Not Be Achieved Soon, But Should Be In The Long-Term Strategy To Increase The Birth Rate In The Health Facility.

Keywords: Community Based Studies, Developing Countries, Health Facility Delivery, Meta-Analysis, Socio-Demographic Variables


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Abstract

Background: Although there is a general agreement on the importance of antenatal care to improve the maternal and perinatal health, little is known about its importance to improve health facility delivery in developing countries. The objective of this study was to assess the association of antenatal care with birth in health facility.

Methods: A systematic review with meta-analysis of Mantel–Haenszel odds ratios was conducted by including seventeen small scale studies that compared antenatal care and health facility delivery between 2003 and 2013. Additionally, national survey data of African countries which included antenatal care, health
facility delivery and maternal mortality in their report were included. Data were accessed via a computer based search from MEDLINE, African Journals Online, HINARI and Google Scholar databases. 

**Results:** The regression analysis of antenatal care with health facility delivery revealed a positive correlation. The pooled analysis also demonstrated that woman attending antenatal care had more than 7 times increased chance of delivering in a health facility. The comparative descriptive analysis, however, demonstrated a big gap between the proportion of antenatal care and health facility delivery by the same individuals (27%–95% vs 4%–45%). Antenatal care and health facility delivery had negative correlation with maternal mortality. 

**Conclusion:** The present regression and meta-analysis has identified the relative advantage of having antenatal care to give birth in health facilities. However, the majority of women who had antenatal care did not show up to a health facility for delivery. Therefore, future research needs to give emphasis to identifying barriers to health facility delivery despite having antenatal care follow up.

**Key words:** antenatal care, community based studies, developing countries, health facility delivery


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**Abstract**

**Background:** Although the common direct obstetric causes of maternal mortality are known from the literature, the contribution of each cause and the change in trend over decades is unknown in Ethiopia. The objective of this review was to assess the trend of proportion of maternal mortality due to the common direct causes. 

**Methods:** This systematic review was done on eighteen health facility based maternal mortality studies conducted between 1980 and 2012 in Ethiopia. Emphasis was given to the proportion of maternal mortality due to direct causes and their case fatality rates. 

**Results:** The summary of the findings has shown that the top four causes of maternal mortality in the year 1980-1999 were abortion related complications (31%), obstructed labor/uterine rupture (29%), sepsis/infection (21%) and hemorrhage (12%). In the last decade, however, the top four causes of maternal mortality were obstructed labor/uterine rupture (36%), hemorrhage (22%), hypertensive disorders of pregnancy (19%) and sepsis/infection (13%). 

**Conclusion:** Abortion and infection related maternal deaths have declined significantly in the last decade. Obstructed labor continues to be the major cause of maternal deaths; maternal deaths due to hypertensive disorders and hemorrhage showed an increasing trend. The findings in this review were somehow comparable with the WHO analysis for Africa in the same period with the exception of obstructed labor.

**Key words:** Abortion, cause, Ethiopia, hemorrhage, maternal mortality, obstructed labor, infection, systematic review


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**Abstract**

**Background:** During perimenopause, vasomotor symptoms are known to have a detrimental effect on women’s functional ability and quality of life. For symptomatic women not eligible for hormonal therapy, desvenlafaxine is an option, but its safety margin and tolerability are not yet determined. 

**Methods:** A computer-based literature search was done in the databases of MEDLINE, Cochrane library, and HINARI (Health InterNetwork Access to Research Initiative). Meta-analysis was conducted by including double-blind randomized controlled studies on the effectiveness and safety of desvenlafaxine in the treatment of hot flashes. The effectiveness, safety and tolerability of desvenlafaxine were determined by standardized mean differences (SMDs) and Mantel-Haenszel odds ratio. Subgroup analysis based on doses
of desvenlafaxine and linear meta-regression analyses were performed for several covariates. Heterogeneity testing, the risk of bias assessment and sensitivity analyses were done.

**Results:** Desvenlafaxine was associated with a statistically significant reduction in the number and severity of daily moderate to severe hot flashes. The number of nighttime awakenings because of hot flashes was also significantly decreased. However, the rate of desvenlafaxine treatment discontinuation because of adverse events was a significantly higher than placebo treated women and the risk ratios of adverse events like asthenia, hypertension, anorexia, constipation, diarrhea, dry mouth, nausea, dizziness, insomnia, somnolence and mydriasis were very high.

**Conclusion:** Desvenlafaxine is effective in the treatment of hot flashes but it is strongly associated with several adverse events and treatment discontinuation. Further clinical trials focusing only on desvenlafaxine related adverse events are highly warranted before it is approved for public use.

**Key words:** clinical trials, desvenlafaxine, hot flash, menopause, meta-analysis


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**Abstract**

**Background:** Although the magnitude of perinatal mortality in Ethiopia was among the highest in Sub Saharan Africa, there was no systematic review done to assess the trend and causes of perinatal death. The objective of this review was to assess the trend of perinatal mortality rate (PMR) and the causes attributed to perinatal deaths.

**Methods:** Studies included in this systematic review were sixteen hospital and community based perinatal mortality studies, which were conducted between 1974 and 2013 using data concerning Ethiopia accessed either electronically or from local journals. The trend of PMR, stillbirth rate (SBR) and early neonatal mortality rate (ENMR) were given emphasis.

**Results:** The PMRs reported from ten hospital based studies were in the range of 66 to 124 per 1000 births. The reports of the large scale community based PMRs were in the range of 37 to 52 per 1000 births. The proportion of stillbirths and early neonatal deaths reported from the hospital based and community based studies was very high (60-110 and 20-34/1000 births); the regression lines demonstrated that SBRs in the hospitals were mirror reflections of ENMRs in the community. The neonatal mortality rate (NMR), however, declined by more than 40% between 1990 and 2011.

**Conclusion:** The PMR of Ethiopia was among the highest in Sub Saharan Africa. Over the decades, both hospital based and community based studies did not show a reduction in perinatal mortality. The trend of perinatal mortality rate has been stable between 90 and 40 per 1000 total births in the hospital and community setting, respectively. The significant reduction in NMR was due to significant decline in late neonatal mortality.

**Keywords:** Causes, early neonatal mortality rate, Ethiopia, perinatal mortality, stillbirth rate, trend

*Yifru Berhan*¹ and Asres Berhan², 2014. Reasons for persistently high maternal and perinatal mortalities in Ethiopia: Part I- Health system factors, *Ethiop J Health Sci, Special Issue, Volume 24,* http://dx.doi.org/10.4314/ejhs.v24i1.10s

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**Abstract**

**Background:** Ethiopia is known for its high maternal and perinatal mortalities as in the case of many Sub Saharan African countries probably due to scarcity of health professionals and health facilities. However, there are no reviews that grossly estimated the maternal and perinatal mortality in relation to the number of physicians and hospitals in the country. The purpose of this review is to assess the contribution of health system factors for maternal and perinatal mortalities.
Methods: A comprehensive literature review was conducted for the period of 1980 to 2012 using the national data for Ethiopia. Data were presented in comparison with the population size, with data from other African countries. Regression analyses of maternal mortality ratio, stillbirth and neonatal mortality rates in relation to number of physicians and hospitals were done.

Results: During the study period, the number of all types of physicians per 10,000 people and number of hospitals per 100,000 people in Ethiopia were in the range of 0.1 to 0.3 and 0.1 to 0.2, respectively, which were among the lowest in Africa. The regression analyses showed negative correlation of maternal mortality ratio, stillbirth and neonatal mortality rates with number of physicians and hospitals. Ethiopia has already achieved the one health center for 25,000 population plan.

Conclusion: In Ethiopia, the physicians and hospitals to population ratios were extremely low, which have probably contributed to the high maternal and perinatal mortality in the last three decades.

Key words: Ethiopia, hospitals, maternal mortality, physicians, systematic review meta-analysis


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Abstract

Background: The major causes of maternal and perinatal deaths are mostly pregnancy related. However, there are several predisposing factors for the increased risk of pregnancy related complications and deaths in developing countries. The objective of this review was to grossly estimate the effect of selected socioeconomic and cultural factors on maternal mortality, stillbirths and neonatal mortality in Ethiopia.

Methods: A comprehensive literature review was conducted focusing on the effect of total fertility rate (TFR), modern contraceptive use, harmful traditional practice, adult literacy rate and level of income on maternal and perinatal mortalities. For the majority of the data, regression analysis and Pearson correlation coefficient were used as a proxy indicator for the association of variables with maternal, fetal and neonatal mortality.

Results: Although there were variations in the methods for estimation, the TFR of women in Ethiopia declined from 5.9 to 4.8 in the last fifteen years, which was in the middle as compared with that of other African countries. The preference of injectable contraceptive method has increased by 7-fold, but the unmet contraceptive need was among the highest in Africa. About 50% reduction in female genital cutting (FGC) was reported although some women’s attitude was positive towards the practice of FGC. The regression analysis demonstrated increased risk of stillbirths, neonatal and maternal mortality with increased TFR. The increased adult literacy rate was associated with increased antenatal care and skilled person attended delivery. Low adult literacy was also found to have a negative association with stillbirths and neonatal and maternal mortality. A similar trend was also observed with income.

Conclusion: Maternal mortality ratio, stillbirth rate and neonatal mortality rate had inverse relations with income and adult education. In Ethiopia, the high total fertility rate, low utilization of contraceptive methods, low adult literacy rate, low income and prevalent harmful traditional practices have probably contributed to the high maternal mortality ratio, stillbirth and neonatal mortality rates.

Key words: adult education, contraception, fertility rate, traditional practice, income, maternal mortality, neonatal mortality, stillbirth


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Abstract

**Background**: During cesarean delivery, extracting a deeply impacted head is a real challenge for obstetricians.

**Objectives**: To compare selected maternal and fetal outcome indicators of the “pull” (reverse breech extraction) and “push” methods for impacted fetal head extraction during cesarean delivery. Search strategy: A computer based search of the Medline, Cochrane library, and HINARI databases. Selection criteria: Studies that compared the maternal and perinatal outcomes of the push and pull methods for impacted fetal head extraction during cesarean delivery were included. Data collection and analysis: A meta-analysis of Mantel–Haenszel odds ratios and standardized mean differences from 11 randomized comparative and retrospective cohort studies was performed.

**Main results**: In the pooled analysis, the risk of uterine incision extension was more than 8 times higher with the push method than with the pull method. Blood loss and operation time were also increased with the push method, and this method was associated with more perinatal deaths and admissions to the neonatal intensive care unit. The risk of wound infection was not significantly different between the 2 methods.

**Conclusions**: The present meta-analysis demonstrated marked reductions in uterine incision extension, blood loss, and operation time with reverse breech extraction.

**Keywords**: Cesarean delivery, Impacted fetal head, Meta-analysis, Push method, Reverse breech extraction

*Yifru Berhan¹ and Asres Berhan², 2014. Review of maternal mortality in Ethiopia: A story of the past 30 years, *Ethiop J Health Sci.*, Special Issue, Volume 24, http://dx.doi.org/10.4314/ejhs.v24i.2s

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Abstract

**Background**: Ethiopia is one of the six countries which have contributed to more than 50% of all maternal deaths across the world. This country has adopted the millennium development goals (MDGs) including reducing the maternal mortality by three-quarter, and put improvement in maternal health as one of the health sector development program (HSDP) performance indicators. The purpose of this study was to review the maternal mortality ratio (MMR) in Ethiopia in the past 30 years using available literature.

**Methods**: A computer based literature search in the databases of MEDLINE, PubMed, HINARI, EBASE, MEASURE DHS, The Cochrane Library, Google Search and Google Scholar was carried out. Manual search for local articles that are not available electronically in full document were also conducted. Eighteen data sources (3 nationally representative surveys, 2 secondary data analyses, 5 small scale community based studies, and 8 hospital based studies) were included in the review. The results of this review are presented in the form of line and stock graphs.

**Results**: The national maternal mortality trend estimated by the central statistics agency of Ethiopia, The Institute for Health Metrics and Evaluation, WHO and other UN agencies showed inconsistent results. Similarly, although there were marked variations in the 95% confidence intervals among individual studies, the small scale community based and hospital based studies have shown that there has been no significant change in maternal mortality over the last three decades. A 22-year cohort analysis from Atat Hospital is the only evidence that demonstrated a very significant drop in maternal mortality among mothers who were kept in the maternity waiting area before the onset of labor.

**Conclusion**: Although the MDG and HSDP envisaged significant improvement in maternal health by this time, this review has shown that the performances are still far from the target. The multisectoral huge investment by the Ethiopian Government is a big hope to reduce the maternal mortality by three-quarters in the near future beyond 2015.

**Keywords**: Community and hospital based, Ethiopia, maternal mortality ratio, trend

*Yifru Berhan¹ and Asres Berhan², 2014. Skilled health personnel attended delivery as a proxy indicator for maternal and perinatal mortality: A systematic review, *Ethiop J Health Sci.*, Special Issue, Volume 24, http://dx.doi.org/10.4314/ejhs.v24i1.7s
Abstract

**Background:** Several demographic and health surveys in Africa have shown the high prevalence of home delivery, but little is known how strongly skilled person unattended deliveries are associated with maternal and perinatal mortality. The aim of this review was to assess the gross correlation of maternal mortality ratios (MMR) and perinatal mortality rates (PMR) with the proportion of skilled health personnel attended deliveries.

**Methods:** In this study, a systematic review was conducted after a computer based literature search was run in the electronic databases from 1990 through September 2013. Bivariate linear regression analyses were done for the proportion of skilled person attended deliveries in relation with MMR, stillbirth and neonatal mortality rates using national survey data of 41 African countries.

**Results:** African countries with relatively small population sizes and with middle to high income were found to have above 90% skilled person attended deliveries. Several African countries with a high proportion of skilled person attended deliveries (60%-100%) were able to reduce the MMR to the range of 56-370/100,000 live births. Several Sub Saharan African (SSA) countries were far from their northern counterparts. The regression analyses demonstrated a negative correlation of the proportion of skilled health personnel attended deliveries with the MMR, stillbirth rate and neonatal mortality rate.

**Conclusion:** According to the national data of the included African countries, skilled delivery attendance was associated with significant reduction of maternal, fetal and neonatal mortality. SSA countries need to benchmark the experience of the North African countries to reduce the high maternal and perinatal deaths.

**Key words:** Africa, maternal mortality, perinatal mortality, skilled person attended delivery, systematic review

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**Summary:** Lymphatic filariasis is known to be endemic in Gambella Region, western Ethiopia, but the full extent of its endemicity in other regions is unknown. A national mapping program for Ethiopia was initiated in 2008. This report summarizes initial data on the prevalence of *Wuchereria bancrofti* antigenaemia based on surveys carried out in a sampled population of 11,685 individuals living in 125 villages (112 districts) of western Ethiopia. The overall prevalence rate was 3.7%, but high geographical clustering and variation in prevalence (ranging from 0% to more than 50%) was found. The prevalence of hydrocele (in males) and lymphoedema of limbs was 0.8% and 3.6% respectively. Significantly higher ($\chi^2 = 49.6; P < 0.01$) prevalence of antigenaemia was noted in known onchocerciasis endemic districts (4.7%) compared to non-onchocerciasis endemic districts (2.3%). Thirty-four of the 112 districts, with a population of 1,547,685 in 2007, were found to be endemic. Of these, the numbers of districts with prevalence rates of >20%, 10–20% and 5–9% were nine, 14 and 20 respectively. Twenty-nine of these 34 endemic districts were found in three regions: Gambella Region (seven districts), Beneshangul-Gumuz Region (13 districts), and Southern Nations, Nationalities and Peoples’ Region (SNNPR) (nine districts). The other five were from Amhara (two districts) and Oromia (three districts) regions. A tentative distribution map has been drawn to facilitate the launching of the Ethiopia LF elimination program.

**Key words:** Lymphatic filariasis, *Wuchereria bancrofti*, Ethiopia, Onchocerciasis, Immunochromatographic Test (ICT), Antigenaemia
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SCHOOL OF PUBLIC AND ENVIRONMENTAL HEALTH

Astatkie A, Demissie M, and Berhane Y, 2014. The association of khat (Catha edulis) chewing and orodental health: A systematic review and meta-analysis, SAMJ, 104(11)

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Abstract

Background: It has been claimed that chewing khat (Catha edulis), a plant common in parts of eastern and southern Africa and the Arabian Peninsula, is associated with a range of orodental problems.

Objective: To provide a synthesis of the evidence on the association between khat chewing and orodental health.

Method: A systematic review and meta-analysis of studies that reported on the association of khat chewing and outcomes related to orodental health identified through a systematic search using web-based electronic search engines.

Results: Nineteen studies were found suitable for this review. Of these, between two and five (based on the type of outcome measured) were suitable for meta-analysis. The rest were used only for qualitative synthesis. A meta-analysis of the association of khat chewing with mucosal white lesions, gum recession, periodontal pocketing and gum bleeding showed that chewing increased the odds of the respective oral problems. However, qualitative synthesis of the findings on the effect of khat chewing on oral micro-organisms showed no evidence that the practice favours the presence of pathogenic micro-organisms in the oral cavity – instead, it seems to favour the proliferation of micro-organisms compatible with orodental health.

Conclusion: Khat chewing is associated with adverse orodental health outcomes. While literature on the topic is scarce and there is a need for generation of more evidence from different countries, on the basis of the evidence accumulated to date, public health officials and health practitioners should consider khat a threat to orodental health and take appropriate action.


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Abstract

Background: In human immunodeficiency virus (HIV) infected individuals immunologic and hematologic abnormalities are common and they increase the risk of morbidity and mortality. Evaluating the hematological and immunological parameters in HIV/AIDS patients on highly active anti-retroviral therapy (HAART) is important in order to monitor the body responses to the drugs. Therefore, assessment of hematological and immunological changes in HIV/AIDS patients on HAART is of a paramount importance. Objective: The main objective of this study was to assess immunologic and hematologic profile of HIV infected children on highly active antiretroviral therapy in Zewditu Memorial Hospital.

Methodology: A retrospective cohort study was conducted among HIV infected children who received HAART between September 2008 and March 2013 at ART clinic of Zewditu Memorial Hospital in Addis Ababa, Ethiopia. Data were collected using structured questionnaire that included variables related to socio-demographic characteristics, immunohematological profiles and clinical conditions of the study individuals. Data was analyzed using SPSS for Windows version 16.0 software.

Result: The mean level of hemoglobin, thrombocyte count and CD4 count showed statistically significant increment from the baseline (p< 0.05). After six months of HAART, the prevalence of anemia, thrombocytopenia and neutropenia among the study children was 21%, 8.3% and 13.3%, respectively.

Conclusion: Our study indicated that the mean hemoglobin, thrombocyte count and CD4 count increased significantly in children who received HAART, but anemia, neutropenia and thrombocytopenia were common before and after treatment among the study subjects. Hence, we recommend the need for regular monitoring and evaluation of immunological and hematological values to enhance targeted interventions for encountered abnormalities.
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*Abel Gedefaw¹, Ayalew Astatkie² and Gizachew Assefa Tessema³, 2013. The prevalence of precancerous cervical cancer lesion among HIV-Infected women in Southern Ethiopia: A cross-sectional study, PLOS ONE, 8(12)

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Abstract

Introduction: The magnitude of precancerous cervical cancer lesions as well as invasive cervical cancer is higher in HIV-infected women than non HIV-infected women. Thus, screening targeting HIV-infected women is being undertaken in developing countries, including Ethiopia. However, data on the prevalence and determinants of precancerous cervical cancer lesion among HIV-infected women in southern Ethiopia is lacking. Thus, this study aimed to assess the prevalence of and factors associated with precancerous cervical cancer lesion among HIV-infected women in southern Ethiopia.

Methods: A hospital-based cross-sectional study was conducted from October 2012 to February 2013 among HIV-infected women in Southern Ethiopia. Four hundred forty eight HIV-infected women who had been screened and treated for precancerous cervical cancer lesion were included in the study. Data were collected by using structured and pretested questionnaire. Visual inspection with acetic acid was applied for screening and treatment. SPSS version 16.0 was used for data entry and analysis. Logistic regression analysis was fitted and odds ratios with 95%Confidence intervals and p-values were computed to identify factors associated with precancerous cervical cancer lesion.

Results: Out of 448 study participants, 99 (22.1%) were found to be positive for precancerous cervical cancer. Being currently on highly active antiretroviral treatment (AOR=0.52, 95%CI: 0.35, 0.92), history of sexually transmitted disease (AOR=2.30, 95%CI: 1.23, 4.29) and having only one lifetime sexual partner (AOR=0.33, 95%CI: 0.20, 0.56) were factors associated with precancerous cervical cancer lesion.

Conclusions: The prevalence of precancerous cervical cancer lesion among HIV-infected women in southern Ethiopia was found to be high. Intervention to access all HIV-infected women like scaling up the limited services and awareness creation should be undertaken. Measures aimed at preventing the acquisition and transmission of sexually transmitted diseases and reducing the number of sexual partners are required. Besides, early initiation of highly active antiretroviral treatment is important.
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the predisposing factors for unsafe sex in both sex. These observations were further strengthened by the low utilization of condoms among students who practiced unsafe sex.

**Conclusion:** This study has shown that some of the students were engaged in risky sexual practice both as unprotected and with multiple partners. Involvement of parents, university officials and other significant community members in a forum discussing this issue with students may bring a change in the students’ sexual behavior.

**Key words:** Ethiopia, risky sexual behavior, qualitative study, University students


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**Abstract**

**Background:** Use of psychoactive substances (PAS) early in school age implies drug dependence in later life. Although no studies have been conducted on undergraduate students of Hawassa University, a few studies in Ethiopia have reported that alcohol, khat, and cigarette are the commonly abused PASs among young high school/ undergraduate university students. Therefore, this study was designed to establish the prevalence of and predictors for PAS use among undergraduate HU Students.

**Methods:** An institution-based quantitative cross-sectional study using the self-administered WHO Model Core Questionnaire to collect information on use of various Psychoactive Substances (PASs) was conducted from June to July 2011. A multistage stratified sampling method was employed to select a total of 586 undergraduate HU students as study participants. Bivariate and multivariate logistic regression analysis were done to determine factors affecting PAS use.

**Results:** Lifetime, past 12 months, and current prevalence rate for overall PAS were 53.6%, 45.7%, and 35.5% respectively. The study depicted that in the past 12 months of the study period 40.8% used alcohol, 20.3% chewed khat, 11.9% smoked cigarettes, and 0.9% used marijuana. The prevalence of other illicit PASs such as Ecstasy, lysergic diethylamide (LSD), cocaine, crack, heroin, solvents or inhalants and un-prescribed psycho active medications was found zero percent (0%). Having family members who used PAS, peer influence, being male, and living alone during school age were found to be positively associated with overall PAS use in the past 12 months.

**Conclusion:** The prevalence of PAS use among undergraduate HU students is high. Designing effective strategies to reduce PAS use should be everyone’s priority.

**Key words:** Psychoactive substance, University students, Khat, Alcohol, Cigarettes, Marijuana


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**Abstract**

**Background:** The coverage and uptake of prevention of mother-to-child transmission (PMTCT) of HIV services has remained very low in Ethiopia. One of the pillars of improving quality of health services is measuring and addressing client satisfaction. In Ethiopia, information about the quality of PMTCT services regarding client satisfaction is meager.

**Methods:** A facility-based cross-sectional study using quantitative methods was conducted in Adama town. We interviewed 423 pregnant women and 31 health providers from eight health facilities. Satisfaction of clients was measured using a standard questionnaire adapted from the UNAIDS best practices collection on HIV/AIDS. Bivariate and multivariate logistic regression analyses were used to identify factors associated with clients’ satisfaction.
Results: About three-fourth (74.7%) of clients reported that they were satisfied with the PMTCT services provided by the health facilities. However, a much lower proportion (39%) of the total respondents (pregnant women who underwent an ANC follow-up session), said they received and understood the messages related to mother-to-child transmission (MTCT) of HIV and PMTCT. The main challenges reported by service providers were lack of training, lack of feedback on job performance and inadequate pay. Clients’ satisfaction with PMTCT service was found to be associated with liking the discussion they had with their counselor, non-preference to a different counselor with regards to sex and/or age and not seeing the same ANC counselor before and after HIV test.

Conclusion: Although 74.7% of clients were satisfied, the majority did not have a good understanding of the counseling on MTCT and PMTCT. We recommend more efforts to be exerted on improving provider-client communication, devising ways of increasing clients’ satisfaction and designing an effective motivation strategy for service providers to enhance the status of PMTCT services.

*Anteneh Asefa¹ and Habtamu Beyene¹, 2013. Awareness and knowledge on timing of mother-to-child transmission of HIV among antenatal care attending women in Southern Ethiopia: A cross sectional study. Reproductive Health, 10: 66

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Abstract

Background: Mother-to-child transmission (MTCT) of HIV infection remains a major public health problem and constitutes the most important cause of HIV infection in children under the age of 15 years old. Awareness on MTCT of HIV and knowledge of its timing usually pose a direct effect on utilization of PMTCT services (mainly HIV testing, infant feeding options and antiretroviral use). The objective of this study is to assess pregnant women’s knowledge on timing of MTCT of HIV in Southern Ethiopia.

Methods: A cross sectional study was conducted in 62 health centers in Southern Ethiopia from February 25 to March 24, 2012. A total of 1325 antenatal care attending women were included in the survey by using a multistage sampling technique. Data were collected using a structured and pre-tested questionnaire. Multiple logistic regression analysis was employed to identify variables associated with women’s knowledge on timing of MTCT of HIV.

Results: All interviewed pregnant women were aware of HIV/AIDS transmission, but only 60.7% were aware of the risk of MTCT. The possibility of MTCT during pregnancy, delivery and breastfeeding was known by 48.4%, 58.6% and 40.7% of the respondents, respectively. The proportion of women who were fully knowledgeable on timing of MTCT was 11.5%. Women’s full knowledge on timing of MTCT was associated with maternal education [AOR = 3.68, 95% CI: 1.49-9.08], and being government employee [AOR = 2.50, 95% CI: 1.23- 5.07]. Whereas, there was a negative association between full knowledge of women on timing of MTCT and no offer of information on MTCT/PMTCT by antenatal care (ANC) service provider [AOR = 0.44, 95% CI: 0.30-0.64], lack of discussion on ANC with male partner [AOR = 0.30, 95% CI: 0.12-0.72], and lack of discussion on HIV/AIDS with male partner [AOR = 0.17, 95% CI: 0.07-0.43].

Conclusion: There was low awareness and knowledge on timing of MTCT of HIV in this study. Hence, strengthening the level of PMTCT services in ANC settings and devising mechanisms to promote involvement of men in PMTCT services is needed.

*Anteneh Asefa¹ and Wondu Teshome¹, 2014. Total delay in treatment among smear positive pulmonary tuberculosis patients in five primary Health Centers, Southern Ethiopia: A cross sectional study. PLoS ONE, 9(7)

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Abstract

Introduction: The global burden of Tuberculosis (TB) remains enormous. Delay in TB diagnosis may lead to a higher infectious pool in the community and a more advanced disease state at presentation increasing the risk of mortality. This study is conducted to determine the total delay before treatment among smear positive Pulmonary Tuberculosis (PTB) patients.

Methods: A health institution based cross sectional study was conducted in five primary health centers in southern Ethiopia from June to December 2012. A total of 328 smear positive PTB patients were enrolled in
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the study. A structured and pretested questionnaire was used. Median patient, diagnostic, and treatment delays were calculated to determine the total delay. Multiple logistic regression analysis was used to identify factors associated with total delay.

**Results:** The median patient, diagnostic, treatment and total delays measured in days were 30 (IQR 20.2, 60), 7 (IQR: 3, 14), 3 (IQR: 1, 4) and 45 (IQR: 34.5, 69.5) days respectively. Patients for whom treatment was not initiated within 45 days of onset of symptom(s) (total delay) constituted 49% of the study participants (59.5% among males and 39.2% among females; P, 0.001). Total delay was found to be associated with: being female [AOR = 0.34, 95% CI: 0.18–0.62], having attended tertiary level education [AOR = 0.11, 95% CI: 0.02–0.55], perceived severity of stigma during the current TB disease course [AOR = 2.18, 95% CI: 1.07, 4.42] and living in houses with higher family size [AOR = 0.26, 95% CI: 0.11, 0.61].

**Conclusion:** Total delay in treatment of TB is still high in the study area. Patient’s sex, perceived stigma, educational status and family size are significantly contributing for total delay. Therefore, a concerted effort should be taken in order to improve health seeking behavior of the community on TB and to reduce delays from seeking care after experiencing TB symptoms.

*Anteneh Asefa¹, Andargachew Kassa² and Muluken Dessalegn³, 2014. Patient satisfaction with outpatient health services in Hawassa University Teaching Hospital, Southern Ethiopia. Journal of Public Health and Epidemiology, 6(2): 101-110

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**Abstract:** The level of patients’ satisfaction is one among the mechanisms used in assessing the quality of health care services. This cross sectional study was conducted in Hawassa University Teaching Hospital to assess level of satisfaction of patients with outpatient health services and factors associated with it. Multiple logistic regression was used to assess the relationship between patients’ satisfaction and possible predictors. Four-fifth (80.1%) of patients reported to be satisfied with the hospital’s outpatient services. Respondents who claimed to have had a long stay in the hospital were found to be more satisfied than those who claimed to have had a very long stay (adjusted odds ratio (AOR) = 4.54, 95% CI: 2.38, 8.65). Furthermore, there was negative association between patients’ satisfaction and not getting required services in the hospital (AOR = 0.78, 95% CI: 0.41, 0.96), lack of privacy (AOR = 0.52, 95% CI: 0.27, 0.78), and absence of good dialogue with outpatient service providers (AOR = 0.28, 95% CI: 0.12, 0.41). Health managers and service providers should devise innovative ways to reduce waiting time, have good dialogue with patients, and maintain privacy of patients in order to improve the level of satisfaction of patients.

**Key words:** Patient, outpatient, satisfaction, hospital.


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**Abstract**

**Background:** Accidental needlestick injury rate among healthcare workers in Hawassa is extremely high. Epidemiological findings proved the infectious potential of this injury contaminated with a Human Immunodeficiency Virus (HIV)-infected patient’s blood. Objective: This study aimed at estimating the risk of HIV transmission from patients to healthcare workers in Hawassa City, Ethiopia.

**Method:** A probabilistic risk model was employed. Scenario-based assumptions were made for the values of parameters following a review of published reports between 2007 and 2010. Parameters: HIV prevalence, needlestick injury rate, exposure rate, sero-conversion rate, risk of HIV transmission and cumulative risk of HIV transmission.

**Finding:** Generally, healthcare workers in Hawassa are considered to be at a relatively low (0.0035%) occupational risk of contracting HIV less than 4 in 100,000 of healthcare workers in the town (1 in 28,751...
workers a year). The 30 years’ maximum cumulative risk estimate is approximately five healthcare workers per 1000 workers in the study area. Still, this small number should be considered a serious matter requiring post-exposure prophylaxis following exposure to unsafe medical practice leading to HIV infection.

**Key words:** Risk of HIV transmission, healthcare workers, Hawassa City


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**Abstract**

**Background:** The larger fraction of infant mortality is that of neonatal; and early neonatal death is the most significant contributor of neonatal mortality as a whole. There are various factors which may be associated with early neonatal mortality and they have been the reasons for the wide variation in mortality rates among the health facilities reporting.

**Objective:** This study was made to assess the independent predictors of early neonatal mortality.

**Methods:** From 2001 through 2005, a total of 3789 live born neonates, who were admitted to the neonatal intensive care unit of Tikur Anbessa Hospital, were included in this study. Variables were classified into two: Socio economic/reproductive factors and maternal/newborn factors. Predictors were assessed using a multivariable binary logistic regression. Variables with a p-value of <0.05 were entered into a multivariable logistic model.

**Results:** From the socio-economic/reproductive variables: age less than one day (AOR=2.53 95% CI= (1.66, 3.85)), having three or more siblings (AOR=2.04, 95% CI= (1.15, 3.64)), second birth order (AOR=1.79, 95% CI= (1.28, 2.51)), absence of antenatal care (AOR=1.70, 95% CI= (1.28, 2.26)), and being unmarried (AOR=1.55 95% CI= (1.20, 2.00)) were independent predictors of increased mortality. On the other hand, singleton pregnancy was found to be protective by 30% against early neonatal mortality with an odds of 0.70, 95% CI of (0.54, 0.90). From the neonatal/ maternal variables: gestational age of <32 weeks (AOR=10.46, 95% CI= (5.39, 20.31)), first minute APGAR of three or less (AOR=2.12, 95% CI= (1.39, 2.23)), presence of any congenital anomaly (AOR=2.02, 95% CI= (1.33, 2.51)), and presence of perinatal asphyxia (AOR=1.82, 95% CI= (1.32, 2.51)), any oxygen treatment (AOR=2.65, 95% CI= (1.89, 3.72)), birth weight less than 1500 (AOR=9.64, 95% CI= (3.32, 27.97)) were independent predictors of neonatal mortality. A normal weight at admission was protective of early neonatal mortality.

**Conclusion:** There are many factors that could have influenced neonatal mortality in the current study. Antenatal care follow up is the key point of contact for planning and managing labor and delivery; it should be improved to control most other variables. The care provided to these high risk babies should also be maximized to reduce mortality in these risk groups.


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**Abstract:** *Helicobacter pylori* (*H. pylori*) infection is associated with several diseases including gastritis, gastric ulcer, pancreatic cancer and iron deficiency anemia. Different epidemiological studies reported controversial findings on the association between O blood group and *H. pylori* infection. This meta-analysis was conducted to verify the association between *H. pylori* infection and O blood group. Random-effects model was used to pool data on the association between *H. pylori* infection and O blood group in 18 selected studies. DerSimonian Liard statistic was used to estimate the effect size. Stability of the pooled estimates was assessed by sensitivity analysis. Publication bias was assessed by using funnel plot and Egger’s test. Fourteen of the 18 included studies reported no significant association between *H. pylori* infection and O blood group. Among ten reviewed studies which were conducted among dyspeptic patients, four showed...
statistically significant association. However, none of six studies conducted among asymptomatic patients demonstrated statistically significant association. The pooled effect size showed no statistically significant association between O blood group and *H. pylori* infection (odds ratio (OR) = 1.18, 95% CI [0.95, 1.48]). However, the pooled effect size under stratified meta-analysis turned to be statistical significant among studies conducted in dyspeptic patients (OR = 1.44; 95% CI [1.03, 2.01]). The analysis did not show statistically significant association between *H. pylori* infection and O blood group among all study participants. However, statistically significant association between *H. pylori* infection and O blood group was observed in a subset of studies conducted among dyspeptic patients. Caution should be made while interpreting the finding as the severity of dyspepsia is not standardized and different *H. pylori* strains were not taken into account.

**Key words:** *Helicobacter pylori*, ABO blood group, O blood group, meta-analysis.


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**Abstract**

**Background:** The measurement of condom use self-efficacy requires contextually suitable, valid and reliable instruments due to variability of the scale across nations with different cultural and ethnic backgrounds. This study aims to construct a condom use self-efficacy scale suitable to Ethiopia (CUSES-E), based on the original scale developed by Brafford and Beck.

**Methods:** A cross-sectional study was conducted on a random sample of 492 students at Hawassa University. A self-administered questionnaire containing 28 items from the original scale was used to collect the data. Principal Component Analysis (PCA) with Varimax rotation was used to extract factor structures. Cronbach’s alpha and itemtotal correlations were used to determine the internal consistency of the scale. The convergent and discriminant validity of the scale was verified using a correlation matrix.

**Results:** The PCA extracted three factors containing a total of 9-items. The extracted factors were labeled Assertiveness, Fear for partner rejection and Intoxicant Control, with internal consistency coefficients (Cronbach’s alpha) of 0.86, 0.86 and 0.92, respectively. Altogether, the factors explained 77.8% of variance in the items. An evaluation of CUSES-E showed a significantly higher self-efficacy score among students who ever used condoms; P < 0.001. The correlation matrix revealed that all of the convergent correlations were higher than the discriminant ones, providing evidence in support of both types of validity. In the split sample validation, the communalities, factor loadings and factor structure were the same on the analysis on each half and the full data set, suggesting that the new scale is generalizable and replicable.

**Conclusion:** This study of CUSES using an Ethiopian population found a different dimension to emerge, suggesting that the scale should be validated to local contexts before application. The CUSES-E is valid, reliable and replicable. Therefore, health cadres and researchers in Ethiopia can apply this scale to promote condom utilization to Ethiopian school youths. However, future research to develop a suitable scale (highly valid and reliable) in concordance with the local vernacular using a prior qualitative study is needed.

**Key words:** Validation, CUSES-E, Hawassa University


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Abstract

Background: Studies have shown that sub-optimal breastfeeding is a major contributor to infant and young child mortality in Ethiopia. To address this problem, infant and young child feeding guideline was developed in 2004 and interventions have been going on based on the guidelines. There is no study that assessed whether the infant and child feeding practices are according to the guideline or not. This study was carried out to assess sub-optimal breastfeeding practices and associated factors among infants from birth to six months in rural communities of Jimma Arjo Woreda in the Southwest Ethiopia.

Methods: A cross-sectional study was carried out from December to January 2009. Quantitative data were collected from a sample of 382 respondents supplemented by qualitative data generated using in-depth interviews of 15 index mothers. Multivariable logistic regression model was used to identify predictors of timely initiation of breast feeding and non-exclusive breast feeding among mother-infant pairs.

Results: More than three fourth of mothers breastfeed their infants sub-optimally. Thirty-seven percent of mothers initiated breastfeeding later than one hour after delivery, which was significantly associated with not attending formal education (AOR = 1.05 [95% CI: 1.03, 1.94]) and painful breastfeeding experiences (AOR = 5.02 [95% CI: 1.01, 10.08]). The majority (67.02%) of mothers had no knowledge about exclusive breastfeeding. Non-exclusive breastfeeding was negatively associated with child’s age of 0-2 months (AOR: 0.27 [95% CI: 0.16, 0.47]) and 3-4 months (AOR = 0.43 [95% CI: 0.25, 0.73]) and ownership of radio (AOR = 0.56 [95% CI: 0.37, 0.88]), but positively associated with the practice of discarding colostrums (AOR = 1.78 [95% CI: 1.09, 4.94]).

Conclusion: The findings showed that the majority of mothers sub-optimally breastfeed their children in the study area. As most of the mothers do not have knowledge on the exclusive breast feeding. Enhancing community based behavior change communications using multiple channels including radio and folk media is recommended to reduce sub-optimal breast feeding practices and associated consequences among children in the study area.

Emebet Tekletsadik¹, Mesganaw Fantahun², and *Debebe Shaweno³, 2014. Is Community Conversation Associated with Human Immunodeficiency Virus Voluntary Counseling and Testing Service Uptake in Rural Communities in Ethiopia? A Comparative Cross-sectional Study. North American Journal of Medical Sciences, 6(2): 77-83

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Abstract

Background: Voluntary counseling and testing (VCT) is a cost-effective tool to prevent and control human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome. Community conversation (CC) is a community-based strategy meant to enhance the community utilization of VCT. However, the role of CC in VCT service uptake has not yet been evaluated.

Aims: This study was conducted to compare VCT service utilization between rural communities with well CC performance and rural communities with poor CC performance in Shebedino woreda. Materials and Methods: A cross sectional comparative community-based study was conducted in 2010 among 462 selected adults in the age bracket of 15-59 years. VCT service uptake was compared between well CC performing communities and poor CC performing communities using two sample test of proportion. Predictors of VCT service uptake were determined using logistic regression model.

Results: Uptake of VCT service and the related VCT knowledge were statistically higher in well CC performing communities than poor CC performing communities; [73.0% vs. 54.1%, P < 0.001] vs. 97.8% vs. 93.8%, P = 0.034]. CC, VCT knowledge, and knowledge on HIV transmission were independent predictors of VCT service utilization.

Conclusion: Uptake of VCT service is higher in well CC performing communities. Emphasis should be given to strengthen CC performance.

Key words: Community conversation, HIV/AIDS, Voluntary counseling and testing, Ethiopia
Academic Success Depends on Research and Publications

*Eskindir Loha¹, Makonnen Asefa¹, Chali Jira¹ and Fasil Tesema¹, 2004. Assessment of quality of care in family planning services in Jimma Zone, Southwest Ethiopia, *Ethiop. J. Health Dev.*, 18(1): 8-18

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Abstract

**Background:** Providing quality of care in family planning services is an important task for care providers so as to increase service utilization and coverage; however, little is known about the existing quality of care in such services.

**Objective:** To assess quality of care in family planning services in Jimma Zone, southwest Ethiopia.

**Methods:** A cross-sectional survey was conducted from January 20-24, 2003 in eight service delivery points in Jimma zone. Three modules consisting six elements of quality in accordance with Bruce-Jain framework were used; observation was made during 687 clients interacting with their providers (the number of providers was 17), exit interview was made with 635 clients, and facility audit was also carried out.

**Results:** More than 80% of unmarried clients were getting the service from non-governmental clinic. Sixty-nine (10.9%) and 14(8.1% of those who reported problem) clients expressed dissatisfaction with waiting time and solutions given by the provider respectively. Method unavailability was the reason in most service delivery points for providing methods different from clients' choices. Most clients were not told method specific and other relevant information. Provider's special training and the time of the training have shown statistically significant difference on six and two quality of care indicators respectively. Majority of the service delivery points did not have copy of guideline and mechanism to make programmatic change based on clients' feedback; all were not supervised in the last three months prior to data collection.

**Conclusion:** Several constraints in the provision of the service are identified and recommendations are forwarded accordingly.


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Abstract

**Background:** Malaria transmission is complex and is believed to be associated with local climate changes. However, simple attempts to extrapolate malaria incidence rates from averaged regional meteorological conditions have proven unsuccessful. Therefore, the objective of this study was to determine if variations in specific meteorological factors are able to consistently predict *P. falciparum* malaria incidence at different locations in south Ethiopia.

**Methods:** Retrospective data from 42 locations were collected including *P. falciparum* malaria incidence for the period of 1998-2007 and meteorological variables such as monthly rainfall (all locations), temperature (17 locations), and relative humidity (three locations). Thirty-five data sets qualified for the analysis. Ljung-Box Q statistics was used for model diagnosis, and R squared or stationary R squared was taken as goodness of fit measure. Time series modelling was carried out using Transfer Function (TF) models and univariate auto-regressive integrated moving average (ARIMA) when there was no significant predictor meteorological variable.

**Results:** Of 35 models, five were discarded because of the significant value of Ljung-Box Q statistics. Past *P. falciparum* malaria incidence alone (17 locations) or when coupled with meteorological variables (four locations) was able to predict *P. falciparum* malaria incidence within statistical significance. All seasonal AIRMA orders were from locations at altitudes above 1742 m. Monthly rainfall, minimum and maximum temperature was able to predict incidence at four, five and two locations, respectively. In contrast, relative humidity was not able to predict *P. falciparum* malaria incidence. The R squared values for the models ranged from 16% to 97%, with the exception of one model which had a negative value. Models with seasonal ARIMA orders were found to perform better. However, the models for predicting *P. falciparum*
malaria incidence varied from location to location, and among lagged effects, data transformation forms, ARIMA and TF orders.

**Conclusions**: This study describes *P. falciparum* malaria incidence models linked with meteorological data. Variability in the models was principally attributed to regional differences, and a single model was not found that fits all locations. Past *P. falciparum* malaria incidence appeared to be a superior predictor than meteorology. Future efforts in malaria modelling may benefit from inclusion of non-meteorological factors.

**Abstract**: We assessed potential effects of local meteorological and environmental conditions, indoor residual spraying with insecticides, insecticide-treated nets (ITNs) use at individual and community levels, and individual factors on Plasmodium falciparum malaria incidence in a village in south Ethiopia. A cohort of 8,121 people was followed for 101 weeks with active and passive surveillance. Among 317 microscopically confirmed P. falciparum malaria episodes, 29.3% occurred among temporary residents. The incidence density was 3.6/10,000 person-weeks of observation. We observed higher malaria incidence among males, children 5–14 years of age, ITNs non-users, the poor, and people who lived closer to vector breeding places. Rainfall increased and indoor residual spraying with Deltamethrin reduced falciparum incidence. Although ITNs prevented falciparum malaria for the users, we did not find that free mass ITNs distribution reduced falciparum malaria on a village level.

**Abstract**

**Background**: Understanding the spatio-temporal pattern of malaria transmission where prevention and control measures are in place will help to fine-tune strategies. The objective of this study was to assess the effect of mass distribution of bednets and indoor residual spraying (IRS) with insecticides on the spatio-temporal clustering of malaria in one malaria endemic village in south Ethiopia.

**Methods**: A longitudinal study was conducted from April 2009 to April 2011. The average population was 6631 in 1346 locations. We used active and passive searches for malaria cases for 101 weeks. SatScan v9.1.1 was used to identify statistically significant retrospective space–time clusters. A discrete Poisson based model was applied with the aim of identifying areas with high rates. PASW Statistics 18 was used to build generalized Poisson loglinear model.

**Results**: The total number of both types of malaria episodes was 622, giving 45.1 episodes per 1000 persons per year; among these, episodes of Plasmodium falciparum and vivax infection numbered 316 (22.9 per 1000 per year) and 306 (22.2 per 1000 per year), respectively. IRS with Dichlorodiphenyltrichloroethane (DDT) and later with Deltamethrin and free mass distribution of insecticide-treated nets (ITNs) were carried out during the study period. There was space–time clustering of malaria episodes at a household level. The spatio-temporal clustering of malaria was not influenced by free mass distribution of ITNs; however, the time-span of the spatio-temporal clustering of malaria cases ended after IRS with Deltamethrin. The presence of clusters on the south-east edge of the village was consistent with the finding of an increasing risk of acquiring malaria infection for individuals who lived closer to the identified vector breeding site.

**Conclusion**: The risk of getting malaria infection varied significantly within one village. Free mass distribution of ITNs did not influence the spatio-temporal clustering of malaria, but IRS might have eliminated malaria clustering.
Academic Success Depends on Research and Publications

Eskindir Loha1,2, Kebede Tefera3 and Bernt Lindtjørn2, 2013. Freely distributed bednets use among Chano Mille residents, south Ethiopia: A longitudinal study, Malar J., 12: 23

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Abstract

Background: A huge discrepancy was reported between ownership versus utilization of insecticide-treated bed nets (ITNs). To acquire the benefits of ITNs, households need to use and not merely own them. The objective of this study was to characterize the pattern of, and assess factors related to ITN use in one village in south Ethiopia.

Methods: A prospective cohort study involving 8,121 residents (in 1,388 households) was carried out from April 2009 to April 2011 (101 weeks). Every week, individuals were asked whether they slept under an ITN the night before the interview. Descriptive statistics was used to report the availability and use of ITN. A negative, binomial, probability, distribution model was fitted to find out significant predictors of ITN use. Reasons for not using ITN were summarized.

Results: The total number of ITNs available at the beginning of the study was 1,631 (1.68 ITNs per household). On week 48, 3,099 new ITNs (PermaNet2.0) were distributed freely (2.3 ITNs per household). The number of households who received at least one new ITN was 1,309 (98.4%). The percentage of children <5 years and pregnant women not using ITNs exceeded that of other adults. The mean (range; SD) ITN use fraction before and after mass distribution was 0.20 (0.15-0.27; 0.03) and 0.62 (0.47-0.69; 0.04), respectively. Before mass ITN distribution, the most frequent reason for not using ITN was having worn out bed nets (most complained the bed nets were torn by rats); and after mass ITN distribution, it was lack of convenient space to hang more than one ITN. Males, younger age groups (mainly 15–24 years) and those living away from the vector-breeding site were less likely to use ITN.

Conclusions: The ITN use fraction reached to a maximum of 69% despite near universal coverage (98.4%) was achieved. Gender, age differences and distance from vector breeding site were associated with ITN use. Strategies may need to be designed addressing disproportions in ITN use, lack of convenient space to hang more than one ITN (for those receiving more than one), and measures to prolong usable life of ITNs.


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Abstract

Background: Perinatal mortality is reported to be five times higher in developing than in developed nations. Little is known about the commonly associated risk factors for perinatal mortality in Southern Nations National Regional State of Ethiopia.

Methods: A case control study for perinatal mortality was conducted in University hospital between 2008 and 2010. Cases were stillbirths and early neonatal deaths. Controls were those live newborns till discharged from the hospital. Subgroup binary logistic regression analyses were done to identify associated risk factors for perinatal mortality, stillbirths and early neonatal deaths.

Results: A total of 1356 newborns (452 cases and 904 controls) were included in this analysis. The adjusted perinatal mortality rate was 85/1000 total delivery. Stillbirths accounted for 87% of total perinatal mortality. The proportion of hospital perinatal deaths was 26%. Obstructed labor was responsible for more than one third of perinatal deaths. Adjusted odds ratios revealed that obstructed labor, malpresentation, preterm birth, antepartum hemmorrhage and hypertensive disorders of pregnancy were independent predictors for high perinatal mortality. In the subgroup analysis, among others, obstructed labor and antepartum hemorrhage found to have independent association with both stillbirths and early neonatal deaths.

Conclusion: The perinatal mortality rate was more than two fold higher than the estimated national perinatal mortality;and obstructed labor, malpresentation, preterm birth, antepartum hemmorrhage and hypertensive disorders of pregnancy were independent predictors. The reason for the poor progress of labor and developing obstructed labor is an area of further investigation.

Keywords: Case control, early neonatal death, Ethiopia, obstructed labor, perinatal mortality, stillbirth
Academic Success Depends on Research and Publications

*Getachew M¹ and Alemayehu A², 2014. Quantification of Chromium (III) and Chromium (VI) in the Electroplating Effluents of Homicho Ammunition Engineering Industry, Journal of Modern Chemistry and Chemical Technology, 5(2)

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Abstract: Chromium is widely used for plating of the surface of ferrous materials to protect from rust as well as increasing strength. The industrial effluents of wastewater from metal plating workshops into the environment have produced huge and complex wastes which far exceed the assimilative capacity of nature and lead to an irreversible health and ecological consequences. So, the study was aimed to quantify chromium (III) and chromium (VI) in the electroplating effluents of Homicho Ammunition Engineering Industry. Wastewater samples were collected during the five working days (Monday to Friday). Chemical analysis and metal concentrations were determined using Flame Atomic Absorption Spectrophotometer and titration. The average results obtained were: Cr+6 (3.904 ± 0.016 mg/L), Cr+3 (1.112 ± 0.023 mg/L), total Cr (5.38 ± 0.415 mg/L). Significant differences (p < 0.05) were found among the wastewater analyzed. The amount of chromium (VI), chromium (III), and total chromium were above the permissible level that is not allowed to the natural water. However, a reduction of substances hazardous to environment has been demanded socially, economically as well as politically. Following the high toxicity of chromium (VI), substitution with environmental friendly chemicals such as chromium (III) and restriction of the use chromium (VI) and follow up should be implemented by Environmental protection authority at national level.

Key words: Chromium (III), Chromium (VI), Wastewater effluent

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Abstract: To elucidate critical components of protective immune responses induced during the natural course of serogroup A meningococcal disease, we studied acute-, early-convalescent-, and late-convalescent-phase sera from Ethiopian patients during outbreaks in 2002 to 2003. Sera were obtained from laboratory-confirmed patients positive for serogroup A sequence type 7 (ST-7) meningococci (A:4/21:P1.20,9) (n =71) and from Ethiopian controls (n =113). The sera were analyzed using an enzyme-linked immunosorbent assay to measure levels of immunoglobulin G (IgG) against serogroup A polysaccharide (APS) and outer membrane vesicles (OMVs) and for serum bactericidal activity (SBA) using both rabbit and human complement sources. Despite relatively high SBA titers and high levels of IgG against APS and OMVs in acute-phase patient sera, significant increases were seen in the early convalescent phase. Antibody concentrations returned to acute-phase levels in the late convalescent phase. Considering all patients’ sera, a significant but low correlation (r =0.46) was observed between SBA with rabbit complement (rSBA) using an ST-5 reference strain and SBA with human complement (hSBA) using an ST-7 strain from Ethiopia. While SBA demonstrated a significant linear relation with IgG against APS, hSBA demonstrated significant linear relationships with IgG against both APS and OMV. This study indicates that antibodies against both outer membrane proteins and APS may be important in providing the protection induced during disease, as

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measured by hSBA. Therefore, outer membrane proteins could also have a role as components of future meningococcal vaccines for the African meningitis belt.

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Abstract: Dissecting the specificities of human antibody responses following disease caused by serogroup A meningococci may be important for the development of improved vaccines. We performed a study of Ethiopian patients during outbreaks in 2002 and 2003. Sera were obtained from 71 patients with meningitis caused by bacteria of sequence type 7, as confirmed by PCR or culture, and from 113 Ethiopian controls. Antibody specificities were analyzed by immunoblotting (IB) against outer membrane antigen extracts of a reference strain and of the patients’ own isolates and by enzyme-linked immunosorbent assay for immunoglobulin G (IgG) levels against lipooligosaccharide (LOS) L11 and the proteins NadA and NspA. IB revealed that the main antigens targeted were the proteins PorA, PorB, RmpM, and Opa/OpcA, as well as LOS. MenA disease induced significant increases in IgG against LOS L11 and NadA. The IgG levels against LOS remained elevated following disease, whereas the IgG anti-NadA levels returned to acute-phase levels in the late convalescent phase. Among adults, the anti-LOS IgG levels were similar in acute-phase patient sera as in control sera, whereas anti-NadA IgG levels were significantly higher in acute-phase sera than in controls. The IgG antibody levels against LOS and NadA correlated moderately but significantly with serum bactericidal activity against MenA strains. Future studies on immune response during MenA disease should take into account the high levels of anti-MenA polysaccharide IgG commonly found in the population and seek to clarify the role of antibodies against subcapsular antigens in protection against MenA disease.

Gunnete Norheim1, Einar Rosenqvist1, Abraham Assefa2, Mohammed Ahmed Yassin3,4, Getahun Mengistu5,6, Afework Kassu5, Dereje Fikremariam7, Wegene Tamire7, Arne Hoiby E.+, Tsegaye Abebe3, Degu Berhanu2, Yarid Merid1, Morten Harboe3,9, and *Dominique A. Caugant1,8, 2006. Characterization of Neisseria meningitidis isolates from recent outbreaks in Ethiopia and comparison with those recovered during the Epidemic of 1988 to 1989. Journal Of Clinical Microbiology, 44(3): 861-871

Abstract: The objectives of this study were to collect and characterize epidemic meningococcal isolates from Ethiopia from 2002 to 2003 and to compare them to 21 strains recovered during the previous large epidemic of 1988 to 1989. Ninety-five patients in all age groups with clinical signs of meningitis and a turbid cerebrospinal fluid (CSF) sample were included in the study of isolates from 2002 to 2003. Seventy-one patients (74.7%) were confirmed as having Neisseria meningitidis either by culture (n = 40) or by porA PCR (n = 31) of their CSF. The overall case fatality rate (CFR) was 11.6%; the N. meningitidis-specific CFR was 4.2%. All 40 strains were fully susceptible to all antibiotics tested except sulfonamide, were serotyped as
A:4/21:P1.20,9, and belonged to sequence type 7 (ST-7). The strains from 1988 to 1989 were also equally susceptible and were characterized as A:4/21:P1.20,9, but they belonged to ST-5. Antigenic characterization of the strains revealed differences in the repertoire of lipooligosaccharides and Opa proteins between the old and the recent strains. PCR analysis of the nine \( lgt \) genes revealed the presence of the \( lgtAHFG \) genes in both old and recent strains; \( lgtB \) was present in only some of the strains, but no correlation with sequence type was observed. Further analysis showed that in addition to their \( pgm \) alleles, the Ethiopian ST-5 and ST-7 strains also differed in their \( tbpB, \) \( opa, \) \( fetA, \) and \( lgtA \) genes. The occurrence of new antigenic structures in strains sharing the same serogroup, PorA, and PorB may help explain the replacement of ST-5 by ST-7 in the African meningitis belt.


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**Abstract**

**Background:** Indoor air pollution from biomass fuel is responsible for 50,320 annual deaths, accounting for 4.9% of the national burden of disease in Ethiopia. Acute respiratory infections are the leading cause of mortality among children in Ethiopia. There is limited research that has examined the association between the use of biomass fuel and acute respiratory infections among children.

**Methods:** A community based cross sectional study was conducted during January to February 2012 among 422 households by systematical sampling method in the slum of Addis Ababa. Data on exposure variables and health information were collected using structured questionnaire by administering face to face interviewing of mothers. Odds ratio with 95% CI for acute respiratory infection was calculated for each variable. Multivariate was used to determine the presence of an association between biomass fuel use and ARI after controlling for other confounding variables.

**Results:** Nearly 253(60%) of children live in households that predominately used biomass fuel. The prevalence of acute respiratory infection was 23.9%. The odds ratios of acute respiratory infection were 2.97 (95% CI: 1.38, 3.87) and 1.96 (95% CI: 0.78-4.89) in households using biomass fuel and kerosene, respectively, relative to cleaner fuels.

**Conclusion:** There is an association between biomass fuel usage and acute respiratory infection in children. The relationship needs investigation which measure indoor air pollution and clinical measures of acute respiratory infection.

**Key words:** Biomass fuel, Acute Respiratory Infection, Children, Slum, Addis Ababa, Ethiopia


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**Abstract:** A cross-sectional study was conducted to assess the water, sanitation, and hygiene status and the knowledge, attitude and practice of home-based care clients of People Living with HIV/AIDS (PLWHA) regarding water, sanitation and hygiene (WSH). Interviews and observation of WSH facilities were carried out on 331 randomly selected PLWHA in Hawassa City, Southern Ethiopia. Though the latrine coverage was high, 43% use latrines not easily accessible, 31% use contaminated latrines and 73.4% of the latrines lacked hand-washing facilities. Thirty-four per cent did not have a reliable source of water and 196 (59%) of the households stored water at home for more than one day. Women were more likely to practice personal hygiene as compared to their men counterparts. Although a good level of knowledge and favourable attitudes about WSH related health problems were observed, two-thirds of the participants believed that diarrheal
infection is not preventable. HIV/AIDS and WSH programmes need to be integrated for better intervention activities in Ethiopia.

**Key words:** Attitude, HIV/AIDS, knowledge, PLWHA, practice, WSH


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**Abstract:** The study was aimed at determining the levels of various heavy metals present in the soil and leachate of the Addis Ababa solid waste dumpsite and its potential ecological and public health risk. Six soil and six leachate samples were analyzed from December 15, 2009 to January 10, 2010. The results indicated that amongst the minerals studied, the levels of Aluminum (Al) was the highest and it ranged between 24720 and 56825 ppm. The concentration of heavy metals viz. zinc (Zn), chromium (Cr), nickel (Ni), cobalt (Co) and lead (Pb) in the soils samples of the dumpsite and nearby open land were found higher than the internationally acceptable limit for the soil. The leachate leads to a surface water stream and it had 99.48%, 95.4%, 93.9%, 85.47%, 84.56%, 83.85%, 81.78%, 77.1%, 56.26%, 9.09% increment in the concentrations of Cr, cadmium (Cd), Pb, potassium (K), manganese (Mn), magnesium (Mg), Ni, Co, iron (Fe) and Zn respectively when compared to the control. No difference was observed in concentrations of trace elements between soil (of the dumpsite) and the nearby grazing land. This study confirms that continuous application dumping of all categories of solid waste on land resulted in accumulation of metals in receiving soils and release of concentrated leachate to the environment which further enters the food chain in form of meat and milk. In the long term it is expected to create a potential food hazard and hence it is recommended that a modern sanitary landfill be constructed immediately with facilities to monitor the ground water contamination facilities, besides remedial measures be undertaken immediately to clean up the existing area using appropriate remediation technologies.

**Key words:** Solid waste, Heavy metals, Trace elements, Leachate, Addis Ababa


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**Abstract:** This paper is aimed to examine the suitability of a series of facultative and maturation ponds for the treatment of hospital wastewater. Sampling were done in different time periods from 2009-2010. The hospital produced 470 liters of wastewater per occupied bed per day. The percentage treatment efficiency of the pond was 94.11, 87.72, 87.1, 86.52, 68.58, 54.81, 54.59, 31.95, 18.12 and 10.58 for BOD, Sulfide, TSS, COD, Nitrate, 5 Nitrite, Total Nitrogen, Total Dissolved Solids, Conductivity and Chloride respectively in decreasing order. However, there was a 204.85% increment for total Ammonia in the effluent of the pond. The organic loading rate was 678.7 kg/he/day and the BOD /COD ratio was 0.455. There were 204.2, 13.1, 8.1, 6.2, 4.5, 2.9 fold increments in concentrations of Zn, Cd, Fe, Pb, Co and Cr respectively in the final treated effluent in the recent year. The treatment efficiency for total and fecal coliform bacteria were 99.74% and 99.36% respectively. However, the effluent still contain large numbers of these bacteria, not suitable for irrigation and aquaculture. The treatment plant is not efficient to threat some selected physicochemical substances. Use of constructed wetlands in conjunction with the existing treatment system is recommended.

**Key words:** Hospital wastewater, E. coli, Trace elements, physicochemical parameters, stabilization ponds.
Academic Success Depends on Research and Publications


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Abstract
Background: Accidental occupational injuries to health care workers continue to have a significant problem in healthcare systems owing to the associated risk of acquiring infections such as hepatitis B, hepatitis C and human immunodeficiency viruses.

Objective: The study examined the prevalence and health risk factors associated with needle stick injury in Hawassa City, Southern Ethiopia.

Method: A cross-sectional survey was conducted in Hawassa City from October to January 2010.

Result: Exposure to unsafe body fluids was common among healthcare workers in Hawassa City. The needle stick injury rate in the study area was 35.8%. Number of clinical procedures performed per day (p value=0.04) and the type of health institution (p value=0.011) were significantly associated with the daily body fluids exposure. Lack of adequate personal protective equipment and negligence in personal safety were common among study participants.

Conclusion: High prevalence of infections among patients in hospitals associated with high rates of occupational exposure to blood may markedly put healthcare workers at risk of infections. Therefore, infection control programs through adherence to standard precautions are critically required.

Key words: Exposure; Body fluids, Needle-sticks injury, Health care workers

*Hunachew B. Mengesha¹ and Biruck Y. Dessalegn², 2014. Solid waste characterization and recycling potential in Hawassa University, Ethiopia, *International Scholarly and Scientific Research and Innovation* 8(2)

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Abstract: Owing to the dramatic expansion of universities in Ethiopia, understanding the composition and nature of solid waste at the source of generation plays an important role in designing a program for an integrated waste management program. In this study, we report the quantity, quality and recycling potential of the waste generated in the three campuses of the Hawassa University, Southern Ethiopia. A total of 3.5 tons of waste was generated per day in the three campuses of the university. More than 95% of the waste constituents were with potential to be recovered. It was a lesson from the study that there was no source reduction, recycling, composting, proper land filling or incineration practices in-place. The considerably high waste generation associated with the expansion of educational programs in the university appears worthwhile requiring implementation of programs for an integrated solid waste management to minimize health risk to humans and reduce environmental implications as a result of improper handling and disposal of wastes.

Key words: Hawassa University, integrated solid waste management, solid waste generation.

*Kindie Desta¹, Sisay Yoseph² and Yared Assefa², 2014. Visual outcome and associated factors of patients who underwent age related cataract surgery at University of Gondar, Referral Hospital, Northwest Ethiopia, *Journal of Advances in Medicine*, 1(1)

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Abstract
Introduction: Cataract is the leading cause of blindness worldwide and at national level. Cataract surgery aims to rehabilitate blind or visually impaired persons by restoring their eye sight so that their quality of life and ability to function are returned to normal or as near normal as possible. According to the world health
organization (WHO) guidelines, after cataract surgery at least 80% of the operated eyes should have a presenting visual acuity (PVA) of ≥6/18 (good visual outcome) and with best correction, at least 90% of the eyes should achieve this level of vision. The visual outcome of cataract surgery being the determinant factor for day to day activity and quality of life, there was no a research conducted on this topic in our study area to evaluate it.

Objective: The objective of the study was to assess visual outcome of cataract surgery and associated factors among patients treated at University of Gondar, Referral Hospital, Northwest Ethiopia.

Materials and methods: A retrospective chart review was conducted from August 29, 2013 to December 20, 2013. The study included charts of ≥40 years’ old patients who had age related cataract surgery in University of Gondar, Referral Hospital from July 1, 2011 to June 30, 2013. Data were collected by trained optometrists using pretested data abstraction form and entry and analysis was done using SPSS version 20. The descriptive statistics, bivariate and multivariable logistic regressions were carried out.

Results: A total of 377 charts were included in the study. The post operative presenting visual outcome was good (VA ≥ 6/18) for 28.4% eyes, borderline (VA 6/24-6/60) for 36.3% eyes and poor (VA < 6/60) for 35.3% eyes. Age (AOR=1.03, CI=1.006-1.054), central corneal scar/ opacity (AOR=3.07, CI=1.120-8.432), corneal edema (AOR=4.70, CI=1.915-11.528), bullous keratopathy (AOR=4.69, CI=1.148-19.172) and second surgery (AOR=3.89, CI=1.243-12.162) were associated factors for poor visual outcome.

Conclusion/ recommendation: The visual outcome after cataract surgery was not in line with the WHO guide lines. Age, central corneal scar/ opacity, corneal edema, bullous keratopathy and second surgery were associated factors for poor visual outcome. Surgeons should apply maximum efforts to avoid second surgery and surgical complications and operated patients should be refracted during their follow ups.

Key words: Cataract; visual outcome; Gondar; Ethiopia

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Abstract

Background: There is a severe healthcare workforce shortage in sub Saharan Africa, which threatens achieving the Millennium Development Goals and attaining an AIDS-free generation. The strength of a healthcare system depends on the skills, competencies, values and availability of its workforce. A well-trained and competent laboratory technologist ensures accurate and reliable results for use in prevention, diagnosis, care and treatment of diseases.

Methods: An assessment of existing preservice education of five medical laboratory schools, followed by remedial intervention and monitoring was conducted. The remedial interventions included 1) standardizing curriculum and implementation; 2) training faculty staff on pedagogical methods and quality management systems; 3) providing teaching materials; and 4) procuring equipment for teaching laboratories to provide practical skills to complement didactic education.

Results: A total of 2,230 undergraduate students from the five universities benefitted from the standardized curriculum. University of Gondar accounted for 252 of 2,230 (11.3%) of the students, Addis Ababa University for 663 (29.7%), Jimma University for 649 (29.1%), Haramaya University for 429 (19.2%) and Hawassa University for 237 (10.6%) of the students. Together the universities graduated 388 and 312 laboratory technologists in 2010/2011 and 2011/2012 academic year, respectively. Practical hands-on training and experience with well-equipped laboratories enhanced and ensured skilled, confident and competent laboratory technologists upon graduation.
Conclusions: Strengthening preservice laboratory education is feasible in resource-limited settings, and emphasizing its merits (ample local capacity, country ownership and sustainability) provides a valuable source of competent laboratory technologists to relieve an overstretched healthcare system.

Key words: Preservice education, PEPFAR, Curriculum, Standardization, Laboratory workforce strengthening, Training, Sustainability


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Abstract

Background: Despite the efforts to reduce iron deficiency during pregnancy, information on the coverage and factors associated with utilization of iron supplements is lacking. The study is intended to assess the coverage, compliance and factors associated with the use of prenatal iron supplements in eight rural districts of Ethiopia.

Methods: The study comprised two independent surveys conducted among pregnant women (n = 414) and women who gave birth in the preceding year of the survey (n = 1573). In both cases, respondents were selected using multistage sampling technique and data were collected via structured questionnaire. Predictors of iron supplement utilization (ranked categories of number of prenatal supplements taken) were identified using ordinal logistic regression. The outputs of the analysis are given using adjusted Odds Ratio (OR) with 95% Confidence Interval (CI).

Results: Among women who gave birth in the preceding year, 35.4% (95% CI: 31.3-39.5) were given/prescribed prenatal iron supplement during the index pregnancy and only 3.5% were supplemented for the recommended 91 or more days. Compared to women who had 4 or more ANC visits, those with 0, 1, 2 and 3 visits had 0.04, 0.34, 0.50 and 0.60 times less odds of iron supplement utilization, respectively. Women lacking comprehensive knowledge of anemia (OR = 0.75 (95% CI: 0.57-0.97)) and those who weren’t informed about the importance of iron supplementation during the pregnancy (OR = 0.05 (95% CI: 0.04-0.07)) had significantly lower utilization. On the other hand, in pregnant women the prevalence of anemia was 33.2%. Among pregnant women who were given/prescribed supplements, the average level of compliance was 74.9% and about 25.1% had less than 70% adherence. The leading reported reasons for non-adherence were side-effects (63.3%) and forgetfulness (16.7%).

Conclusion: Promoting early and frequent ANC, enhancing the quality of ANC counseling and promoting the knowledge of women on anemia are essential strategies for improving the utilization of iron supplements.

Key words: Iron supplementation, Maternal anemia, Compliance

*Samson Gebremedhin, 2014. Effect of a single high dose vitamin A supplementation on the hemoglobin status of children aged 6–59 months: Propensity score matched retrospective cohort study based on the data of Ethiopian Demographic and Health Survey 2011. BMC Pediatrics, 14: 79

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Abstract

Background: Vitamin A deficiency can cause anemia as the nutrient is essential for hematopoiesis, mobilization of iron store and immunity. Nevertheless, clinical trials endeavored to evaluate the effect of Vitamin A Supplementation (VAS) on hemoglobin concluded inconsistently. Accordingly, the objective of the current study is to assess the effect of single high dose VAS on the hemoglobin status of children aged 6–59 months.

Methods: The study was conducted based on the data of Ethiopian Demographic Health Survey 2011. The data from 2397 children aged 6–59 months who received a single dose of 30 or 60 mg of VAS (depending on age) in the preceding 6 months were matched with similar number children who did not receive the supplement in the reference period. The matching was based on propensity scores generated from potential
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confounders. Distributions of hemoglobin concentration and risks of anemia were compared between the groups using paired t-test, matched Relative Risk (RR) and standardized mean difference.

**Result:** The supplemented and non-supplemented groups were homogeneous in pertinent socio-demographic variables. Compared to propensity score matched non-supplemented children, those who received vitamin A had a 1.50 (95% CI: 0.30-2.70) g/l higher hemoglobin concentration (P = 0.014). In the supplemented and non-supplemented groups, the prevalences of anemia were 46.4% and 53.9%, respectively. VAS was associated with a 9% reduction in the risk of anemia (RR = 0.91 (95% CI: 0.86-0.96)). Stratified analysis based on household wealth status indicated that the association between VAS and hemoglobin status was restricted to children from the poor households (RR = 0.74 (95% CI: 0.61-0.90)). Effect size estimates among all children (Cohen’s d = 0.07) and children from poor households (d = 2.0) were modest.

**Conclusion:** Single high dose VAS among Ethiopian children 6–59 months of age was associated with a modest increase in hemoglobin and decrease in risk of anemia. Household wealth status may modify the apparent association between VAS and hemoglobin status.

**Key words:** Vitamin A supplementation, Anemia, Hemoglobin

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**Abstract**

**Background:** According to the World Health Organization, Caesarean Section (CS) rate (percentage of births managed by CS) exceeding 15% lacks medical justification and it could be linked with adverse maternal and child health consequences. Nonetheless, the rate in Addis Ababa city is beyond the aforementioned level. The objectives of the study were to assess the trend and socio-demographic differentials of CS rate in the city.

**Methods:** The study was made based on the three Ethiopia Demographic and Health Surveys (EDHS) data (EDHS 2000, 2005 and 2011). The trend over the period of 1995–2010 was assessed using simple linear regression analysis whereas the differentials of CS rate were identified based on DHS 2011 data. CS rates were compared across categories of various socio-economic variables using chi-square test.

**Results:** The CS rate increased significantly from 2.3% in 1995–1996 to 24.4% in 2009–2010. From 2003 onwards, it persisted above 15%. The rates among women with secondary (32.3%) or higher (33.3%) levels of education were nearly two times higher than the corresponding figures in the illiterates (14.8%) and women with primary education (15.8%) (P < 0.001). The level among women from the ‘rich’ households (28.6%) was higher than those from the ‘poor’ (16.4%) and ‘middle’ (19.5%) households (P = 0.016). The rate also significantly increased with rising parity (P = 0.023). The rate among women who delivered in private health institutions (41.7%) was twice higher than their counterparts who delivered in public institutions (20.6%).

**Conclusion:** The CS rate in Addis Ababa has exceeded beyond the level recommended by the WHO. Accordingly, It should be maintained within the optimum 5-15% range by introducing medical audit for labor management both in the private and public health institutions. Further, during prenatal care pregnant women should be fully informed about the risks of medically unjustified CS.

**Key words:** Caesarean section, Maternal health, Addis Ababa


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**Abstract:** In order to assess the prevalence and correlates of prenatal anemia, a survey was conducted among 700 randomly selected pregnant women in rural Sidama, Southern Ethiopia. The prevalences of anemia, Iron Deficiency (ID) and ID anemia were 31.6%, 17.4% and 8.7%, respectively. The burden of anemia was
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significantly high among illiterates, women devoid of self-income, lowlanders, multiparas and women aged 25-34 years. Women who weren’t on iron-folate supplementation had 1.90 (95% Confidence Interval (CI): 1.14-3.19) times increased odds of anemia. Anemia was associated with ID, zinc deficiency and elevated C-reactive protein with odds ratio of 2.46 (95%CI: 1.63-3.73), 2.29 (95%CI: 1.62-3.23) and 1.98 (95%CI: 1.12-3.47) respectively; however, it was not associated with vitamin A deficiency. Though ID was a significant correlate of anemia, only 11.8% of anemia was attributable to it. Zinc, iron and vitamin A deficiencies did not show synergistic interaction in associating with anemia. (Afr J Reprod Health 2014; 18[1]: 44-53).

Key words: Maternal nutrition, maternal anemia, anemia in pregnancy


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Abstract: A cross-sectional study was conducted to assess the prevalence and correlates of prenatal vitamin A deficiency (VAD) in rural Sidama, Southern Ethiopia. Seven hundred randomly-selected pregnant women took part in the study. Serum retinol concentration was determined using high-performance liquid chromatography. Data were analyzed by logistic and linear regression. Interpretation of data was made using adjusted odds ratio (AOR) and adjusted linear regression coefficient. The prevalence of VAD (serum retinol <0.7 µmol/L) was 37.9%. Advanced gestational age and elevated C-reactive protein (CRP ≥5 mg/dL) were negatively associated with retinol concentration (p<0.05). The odds of VAD was significantly higher among the women with no education and those devoid of self-income. Women aged 35-49 years had 2.23 (95% CI 1.31-3.81) times higher odds compared to those aged 15-24 years. The lower the dietary diversity score in the preceding day of the survey, the higher were the odds of VAD. With reference to nulliparas, grand multiparas had 1.92 (95% CI 1.02-3.64) times increased odds of VAD. VAD and zinc deficiency (serum zinc <8.6 µmol/L during the first trimester, or <7.6 µmol/L during the second or third trimester) were significantly associated with AOR of 1.80 (95% CI 1.28-2.53). VAD has major public-health significance in the area. Accordingly, it should be combated through enhancement of diet diversity, birth control, and socioeconomic empowerment of women.

Key words: Maternal nutrition, Nutritional surveys, Serum retinol, Vitamin A deficiency, Ethiopia


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Abstract

Background: Vitamin A plays vital role in the physiology of vision and immunity. Globally quarters of a billion children are Vitamin A deficient. Vitamin A supplementation of children and mothers during postpartum period is a key strategy to avert the deficiency. However the effect of Vitamin A supplementation on incidence of childhood illnesses is controversial.

Objective: To assess the effect of Vitamin A supplementation on the reduction of common childhood illnesses, and to measure the coverage of vitamin A supplementation among children aged 6-59 months and mothers during postpartum period.

Methods: A retrospective cohort study which involves comparison between Vitamin A supplemented and non-supplemented children was conducted in Feb 2008 in Boloso Sore Woreda, Wolayta Zone, SNNPR. A total of 1601 children aged 6-59 months were selected using Probability Proportional to Size (PPS) sampling technique.

Results: Vitamin A supplementation coverage among children (6-59 months) was 83.1% and among women (in postpartum period) who had given birth in the preceding 12 months of the survey was 13.2%. In
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comparison with the corresponding level in 2005, the coverage in the area has increased significantly (P<0.05). Most of the vitamin A supplementation coverage was achieved through Enhanced Outreach Strategy. Vitamin A supplementation status was not significantly associated with history of Fever [AOR=1.26 (95%CI 0.89-1.77)], Cough or rapid breathing/difficulty in breathing [AOR=1.15 (95%CI 0.77-1.72)], Eye infection [AOR=1.22 (95%CI 0.78-1.89)], and Diarrhea [AOR=0.98 (95%CI 0.64-1.52)].

Recommendations: The effect of Vitamin A supplementation on reduction of childhood illnesses should be assessed through longitudinal studies among Vitamin A deficient children.

Seifu Hagos¹, Debebe Shaweno², Meselech Assegid¹, Alemayehu Mekonnen¹, Megsanaw Fantahun Afework³ and Saifuddin Ahmed³, 2014. Utilization of institutional delivery service at Wukro and Butajera districts in the Northern and South Central Ethiopia, BMC Pregnancy and Childbirth, 14(178): 1471-2393

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Abstract
Background: Ethiopia has one of the highest maternal mortality in the world. Institutional delivery is the key intervention in reducing maternal mortality and complications. However, the uptake of the service has remained low and the factors which contribute to this low uptake appear to vary widely. Our study aims to determine the magnitude and identify factors affecting delivery at health institution in two districts in Ethiopia.

Methods: A community based cross sectional household survey was conducted from January to February 2012 in 12 randomly selected villages of Wukro and Butajera districts in the northern and south central parts of Ethiopia, respectively. Data were collected using a pretested questionnaire from 4949 women who delivered in the two years preceding the survey.

Results: One in four women delivered the index child at a health facility. Among women who delivered at health facility, 16.1% deliveries were in government hospitals and 7.8% were in health centers. The factors that significantly affected institutional delivery in this study were district in which the women lived (AOR: 2.21, 95% CI: 1.28, 3.82), women age at interview (AOR: 1.96, 95% CI: 1.05, 3.62), women’s education (AOR: 3.53, 95% CI: 1.22, 10.20), wealth status (AOR: 16.82, 95% CI: 7.96, 35.54), women’s occupation (AOR: 1.50, 95% CI: 1.01, 2.24), antenatal care (4+) use (AOR: 1.77, 95% CI: 1.42, 2.20), and number of pregnancies (AOR: 0.25, 95% CI: 0.18,0.35). We found that women who were autonomous in decision making about place of delivery were less likely to deliver in health facility (AOR:0.38, 95% CI: 0.23,0.63).

Conclusions: Institutional delivery is still low in the Ethiopia. The most important factors that determine use of institutional delivery appear to be women education and household economic status. Women’s autonomy in decision making on place of delivery did not improve health facility delivery in our study population. Actions targeting the disadvantaged, improving quality of services and service availability in the area are likely to significantly increase institutional delivery.

Key words: Skilled attendance birth, Institutional delivery, Ethiopia

*Shimelash Bitew¹, Samrawit Ketema¹, Minyiehal Worku¹, Mustefa Hamu¹ and Eskindir Loha¹, 2013. Knowledge and attitude of women of childbearing age towards the legalization of abortion, Ethiopia, Journal of Science and Innovative Research, 2(2): 192-203

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Abstract
Background: Unsafe abortion is the 3rd most common cause of maternal morbidity and mortality in our country. So as to decrease these, our country puts legislations on abortion practices. To make application of
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this legislation knowledge and attitude of the society is very important. Objective: To assess the knowledge and attitude of women of childbearing age towards abortion and its legalization in Yirga Cheffe town.

Method: A community based cross sectional study was done in Yirga cheffe town SNNPR from March 29-April 10, 2010. We have 422 total sample sizes, out of these pretest was done by taking 5%. We selected our study subjects by systematic random sampling method. We analyze the data by using scientific calculator and computer. Chi square and other statistical tests were used.

Result: The response rate was 97.3%. The respondent was in the age range of 15-49 years. The mean age of respondents was 26 years in a range of 25-29 years. Of the respondents 78.21% have knowledge about abortion and its complication. Out of total respondents that use family planning currently is 57.18% and that know about emergency contraceptive were 39.49%. This study shows 48.9% have knowledge about the legalization of abortion. From these 61.17% had a positive attitude on the legalization of abortion and the rest 33.51% had negative attitudes on the legalization of abortion and. Around 5.32% had a neutral idea.

Conclusion: Generally from this study, we can conclude that above half had knowledge about abortion and its complication, almost half had knowledge about the legalization of abortion. From these 61.17% agreed on legalized abortion law.

Keywords: Abortion, Attitude towards Abortion, Knowledge about Abortion complication.

*Teferi Abegaz1, Yemane Berhane2, Alemayehu Worku3 and Abebe Assrat4, 2014. Effectiveness of an improved road safety policy in Ethiopia: an interrupted time series study, BMC Public Health, 14:539

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Abstract

Background: In recent years, there has been an increasing interest in implementing road safety policy by different low income countries. However; the evidence is scarce on its success in the reduction of crashes, injuries and deaths. This study was conducted to assess whether road crashes, injuries and fatalities was reduced following the road safety regulation introduced as of September 2007 by Oromia Regional State Transport Bureau.

Methods: Routine road traffic accident data for the year 2002-2011 were collected from sixteen traffic police offices. Data on average daily vehicle flow was obtained from the Ethiopian Road Authority. Interrupted time series design using segmented linear regression model was applied to estimate the effect of an improved road safety policy.

Results: A total of 4,053 crashes occurred on Addis Ababa - Adama/Hawassa main road. Of these crashes, almost half 46.4% (1,880) were property damage, 29.4% (1,193) were fatal and 24.2% (980) injury crashes, resulting 1,392 fatalities and 1,749 injuries. There were statistically significant reductions in non-injury crashes and deaths. Non-injury crash was reduced by 19% and fatality by 12.4% in the first year of implementing the revised transport safety regulation.

Conclusion: Although revised road safety policy helped in reducing motor vehicle crashes and associated fatalities, the overall incidence rate is still very high. Further action is required to avoid unnecessary loss of lives.

Key words: Road crash, Road injury, Road death, Road safety law effectiveness

*Teferi Abegaz1, Yemane Berhane2, Alemayehu Worku3, Abebe Assrat4 and Abebayehu Assefa5, 2014. Road traffic deaths and injuries are under-reported in Ethiopia: A capture-recapture Method, PLOS ONE, 9(7)

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Abstract: In low and middle income countries road traffic injuries are commonly under-reported. This problem is significantly higher among those less severely injured road users. The objective of this study was to determine the incidence and the level of ascertainment of road traffic injuries and deaths by traffic police and hospital registry. In this study two-sample capturerecapture method was applied using data from traffic police and hospital injury surveillance, through June 2012 to May 2013. The study was conducted on one of the busiest highways in Ethiopia, the Addis Ababa – Hawassa highway. Primary data were collected by accident investigators and hospital emergency nurses using a structured checklist. Four matching variables; name of the victim, sex, place and time of the accidents was used to get the matched cases. During the study period the police independently reported 224 deaths and 446 injuries/billion vehicle kilometer while hospitals reported 123 deaths and 1,046 injuries/billion vehicle kilometer. Both sources in common captured 73 deaths and 248 injuries/billion vehicle kilometer. Taking the two data sources into consideration, the capture-recapture model estimated the incidence of deaths and injuries ranged 368–390 and 1,869–1,895 per billion vehicle kilometer, respectively. The police source captured 57.4%–60.9% of deaths and 23.5%–23.9% of injuries while the hospital sources captured 31.5%–33.4% of deaths and 55.2%– 56% of injuries. Deaths and injuries among females, younger age victims, cyclists/motorcyclists and pedestrians were underreported by traffic police. In conclusion neither of the two sources independently provided accurate coverage of road traffic incident related deaths and injuries. Strengthening both systems is necessary to obtain accurate information on road accidents and human causalities.

*Teferi Abegaza1, Yemane Berhane2, Alemayehu Worku3, Abebe Assrat4 and Abebayehu Assefa5 2014. Effects of excessive speeding and falling asleep while driving on crashinjury severity in Ethiopia: A generalized ordered logit model analysis, Accident Analysis and Prevention, 71: 15-21

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Abstract: The severity of injury from vehicle crash is a result of a complex interaction of factors related to drivers' behavior, vehicle characteristics, road geometric and environmental conditions. Knowing to what extent each factor contributes to the severity of an injury is very important. The objective of the study was to assess factors that contribute to crash injury severity in Ethiopia. Data was collected from June 2012 to July 2013 on one of the main and busiest highway of Ethiopia, which extends from the capital Addis Ababa to Hawassa. During the study period a total of 819 road crashes was recorded and investigated by trained crash detectors. A generalized ordered logit/partial proportional odds model was used to examine factors that might influence the severity of crash injury. Model estimation result suggested that, alcohol use (Coef. = 0.5565; p-value = 0.017), falling asleep while driving (Coef. = 1.3102; p-value = 0.000), driving at night time in the absence of street light (Coef. = 0.3920; p-value = 0.033), rainfall (Coef. = 0.9164; p-value = 0.000) and being a minibus or vans (Coef. = 0.5065; p-value = 0.013) were found to be increased crash injury severity. On the other hand, speeding was identified to have varying coefficients for different injury levels, its highest effects on severe and fatal crashes. In this study risky driving behaviors (speeding, alcohol use and sleep/fatigue) were a powerful predictor of crash injury severity. Therefore, better driver licensing and road safety awareness campaign complimented with strict police enforcement can play apivotal role to improve road safety. Further effort needed as well to monitor speed control strategies like; using the radar control and physical speed restraint measures (i.e. rumble strips).

Keywords: Injury severity, Generalized ordered logit model, Significant factors, Highway safety

*Torleif Markussen Lunde1,2,5, Diriba Korecha1,5, Eskindir Loha3, Asgeir Sorteberg2,5 and Bernt Lindtjørn1, 2013. A dynamic model of some malaria-transmitting anopheline mosquitoes of the afrotropical region. I. Model description and sensitivity analysis, Malar J., 12: 28

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Abstract

Background: Most of the current biophysical models designed to address the large-scale distribution of malaria assume that transmission of the disease is independent of the vector involved. Another common assumption in these type of model is that the mortality rate of mosquitoes is constant over their life span and that their dispersion is negligible. Mosquito models are important in the prediction of malaria and hence there is a need for a realistic representation of the vectors involved.

Results: We construct a biophysical model including two competing species, *Anopheles gambiae* s.s. and *Anopheles arabiensis*. Sensitivity analysis highlights the importance of relative humidity and mosquito size, the initial conditions and dispersion, and a rarely used parameter, the probability of finding blood. We also show that the assumption of exponential mortality of adult mosquitoes does not match the observed data, and suggest that an age dimension can overcome this problem.

Conclusions: This study highlights some of the assumptions commonly used when constructing mosquito-malaria models and presents a realistic model of *An. gambiae* s.s. and *An. arabiensis* and their interaction. This new mosquito model, OMaWa, can improve our understanding of the dynamics of these vectors, which in turn can be used to understand the dynamics of malaria.

Key words: *Anopheles gambiae* complex, Model, Malaria

Wakgari Deressa¹ Assefa Seme¹, Anteneh Asefa², Getachew Teshome³ and Fikre Enqusellassie¹, 2014. Utilization of PMTCT services and associated factors among pregnant women attending antenatal clinics in Addis Ababa, Ethiopia. *BMC Pregnancy and Childbirth*, 14: 328

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Abstract

Background: Mother-to-child transmission (MTCT) of human immunodeficiency virus (HIV) remains the major source of HIV infection in young children. Targeting pregnant women attending antenatal clinics provide a unique opportunity for implementing prevention of mother-to-child transmission (PMTCT) programmes against HIV infection of newborn babies. This study aimed to investigate factors associated with the acceptability and utilization of PMTCT of HIV.

Methods: An institution based cross-sectional study was conducted in April 2010 using exit interviews with 843 pregnant women attending antenatal care (ANC) clinics of 10 health centers and two hospitals in Addis Ababa, Ethiopia. Trained nurses administered structured questionnaires to collect data on socio-demographic characteristics, knowledge about MTCT, practice of HIV testing and satisfaction with the antenatal care services. Six focus group discussions among pregnant women and 22 in-depth interviews with service providers complemented the quantitative data.

Results: About 94% of the pregnant women visited the health facility for ANC check-up. Only 18% and 9% of respondents attended the facility for HIV counselling and testing (HCT) and receiving antiretroviral prophylaxis, respectively. About 90% knew that a mother with HIV can pass the virus to her child, and MTCT through breast milk was commonly cited by most women (72.4%) than transmission during pregnancy (49.7%) or delivery (49.5%). About 94% of them reported that they were tested for HIV in the current pregnancy and 60% replied that their partners were also tested for HIV. About 80% of the respondents reported adequacy of privacy and confidentiality during counseling (90.8% at hospitals and 78.6% at health centers), but 16% wished to have a different counselor. Absence of counselors, poor counselling, lack of awareness and knowledge about HCT, lack of interest and psychological unpreparedness were the main reasons cited for not undergoing HIV testing during the current pregnancy.

Conclusions: HIV testing among ANC attendees and knowledge about MTCT of HIV was quite high. Efforts should be made to improve the quality and coverage of HCT services and mitigate the barriers preventing mothers from seeking HIV testing. Further research should be conducted to evaluate the uptake of antiretroviral prophylaxis among HIV-positive pregnant women attending ANC clinics.

Keywords: Human immunodeficiency virus, Prevention of mother to child transmission, Human immunodeficiency virus counseling and testing, Antenatal care, Addis Ababa, Ethiopia

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Abstract: The purpose of this study was to investigate the impact of working conditions at school on teachers’ level of instructional media use in the primary school system of Gedeo Zone, southern Ethiopia. The survey was made on a sample of 139 (24.4 % female and male 75.6 %) teachers who were randomly drawn from 9 primary schools (four rural and five urban primary schools). The instruments used to generate data were self-reported questionnaires tapping the level of instructional media use and the associated school-level environmental factors. The findings based on Factor Analysis revealed three independent dimensions of school environment factors related to the use of instructional media by teachers. It is further disclosed that the level of use of instructional media is low with an average frequency of use swinging between once in two weeks to twice in three weeks during four weeks of instruction. The implications of the findings related to pre-service and in-service teacher training are also discussed.


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Abstract: This study examines current policies and practices affecting the functioning of postsecondary institutions in terms of creating opportunities for adult and lifelong learning in Ethiopia. Data were collected from official documents, government statistics, as well as a telephone interview with ten officials of five purposefully selected public post-secondary institutions. The results show that existing national policies and programs related to adult and continuing education are limited in their coverage which in turn, affected not only institutional rules and regulations, but also actual practice. Thus, adult and continuing education programs found to be less responsive to the needs adult learners though they represent a sizable enrollment share accounting for 31.5% in the evening, summer, and distance education programs in public institutions alone. Further, the study uncovers the existing gaps in policy and practice in terms efficiently utilizing post-secondary institutions as venues of adult and continuing education, and as centers of lifelong learning. Finally, the paper calls for fundamental national-level policy attention to redirect institutional level policies and code of practice which would subsequently impact organizational structure, curricula, and research undertaking in post-secondary institutions in Ethiopia.

Key words: Adult Education, continuing education, lifelong learning, post-secondary institutions, Ethiopia


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Abstract: This article examines the impediments of primary school attendance among young children amid increasing gross primary school enrolment at both regional and federal levels. Accordingly, a survey of was conducted on 263 households randomly selected in two rural localities of Sidama Zone, Southern Ethiopia. In addition, interview was made with 10 teachers and two principals of the local schools to complement the survey data. The data generated were analyzed using qualitative and quantitative procedures. The findings reveal that the likelihood that households enrol school-age children depends on family size and location of the households while the likelihood of child dropping out was found to
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significantly vary as a function of location and suggesting a strong linkage between location and level of household poverty. On the other hand, preferential treatment of boys over girls while making enrolment decision was associated with father’s literacy status, location, and gender of the household head. The policy implication that help strengthen the inclusion of disadvantaged children into the school system in view of achieving Universal Primary Education (UPE) by 2015 are discussed.

Key words: Child schooling, school dropping out, sex-preference, enrolment, Sidama.


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Abstract: The presented study investigated the pattern of female academic success in higher education and their prospects of progressing in the system. The study is based on primary data on academic status, socio-cultural and psychological factors, and personal background variables. The sample included 134(Male = 94 and Female = 40) students admitted in the 2002/3 and 2003/4 academic years into Dilla College of Teacher Education and Health Sciences, Debub University. The instruments used to collect information include students’ academic performance records, and a self-administered measure assessing respondents’ gender role attitude (GRA), and domain-specific academic self-concepts for Biology (BSC), English (ESC), Mathematics (MSC), and Physics (PSC), and perceived parental expectation of future career. The results indicated a strong and systematic relationship between academic self-concept (ASC) of ability scores with college GPA. In addition, females generally show low academic self-concept of ability in traditionally masculine subjects such as Mathematics (MSC) and Physics (PSC) while no variation was found in Biology (BSC) and English (ESC). Male and female students did not significantly differ in their gender role attitude (GRA); and they are found to have been influenced by their parents to assume careers consistent with the prevailing traditional gender stereotypes. Finally, the paper forwards policy implications for the promotion of gender equality in Ethiopian higher education institutions.


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Abstract: This study is summoned by the recent curriculum reform initiative (2007-2008) of the Ethiopian Higher Education (HE) which also includes the secondary teacher preparation programs. The initiative seems to consider replacing the integrated teacher preparation program by the End-on/add-on structure. Thus, this paper intends to assess the two widely known path ways into teaching against the backdrop of the current international practice drawn from education systems in Asia, North America, and the United Kingdom. In addition, primary data were collected through a semi-structured questionnaire from 24 experienced teacher educators. The results reveal that the existing empirical literature fail to demonstrate a systematic link between the modalities of pre-service teacher training with effective teaching that impact student achievement gains. On the other hand, the findings of the survey show that the majority of the teacher educators are in favour of the blended/integrated model of teacher preparation giving more importance to opportunities created by the blended model in connecting content and pedagogy, adequate time for psychological preparation, and socialization into teaching. Finally, based on the survey results and existing international practices the paper outlined policy implications for effective teacher preparation programs in Ethiopia.

Key words: Blended/integrated teacher preparation, pedagogical content knowledge, End-on teacher preparation, Ethiopia.


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Abstract: As globalization gets its foothold in Africa, the people have started to feel its effects as they are grappling with the new challenges coming along with it. The impacts are also gradually beginning to be felt as globalization begins to engulf the higher education sector. Willingly or otherwise, Africa seems to have come to terms with the fact that the hegemony of public higher education establishments would be a history as soon as the continent’s private institutions emerge as a potent alternative. Like its counterparts in Africa, Ethiopia has not only acknowledged, but also actively responded to the changing situation as evidenced by the new reforms and policies introduced to higher education system. Informed by the new world order, Ethiopia has recently adopted a liberal policy stance that encouraged local private investment as well as foreign players though the country is not yet a party to the General Agreement on Trade and Services (GATS). The general Agreement on Trade and Services obliges member countries to open up their domestic markets to foreign institutions and companies engaged in commercialization of higher education. This short paper shades light on the status of private HE in Ethiopia in view of its promises, pitfalls, and potentials in strengthening the higher education system.

*Tesfaye Semela¹, 2007. Identification of factors contributing to gender disparity in an Ethiopian University, Eastern Africa Social Science Research Review, 23(2): 71-93

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Abstract: This study aims to identify factors that underpin gender disparity in participation in higher education in the context of an Ethiopian public university. Data were generated using a semi-structured interview with 20 female undergraduates and quantitative information obtained from University's Registrar Office. The results show that enrolment has increased in absolute numbers while female dismissal rates soared alarmingly between 2000/01-2004/05. To bridge the gender disparity in participation, the paper recommends intervention strategies aimed at bolstering academic achievement and positive self-concept among female students.

Keywords: Academic self-concept, academic success, affirmative action, attrition, gender disparity


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Abstract: This study examines teachers’ perceptions of extra-roles in school organisational contexts. The participants are 319 (234 male and 85 female) primary and secondary school teachers in Sidama Zone, Southern Ethiopia. The study employed a multi-dimensional extra-role behaviour (ERB) scale. Univariate, bivariate and multivariate statistical analyses procedures are used to answer the questions. The findings reveal that female teachers are generally more willing to volunteer for extra-roles towards the team (or co-workers) than do males. Rural teachers, however, are less enthusiastic about involvement in extra roles towards the student and the organisation compared with their urban and suburban counterparts. In addition, job-related personal characteristics (i.e. personal teaching efficacy and job satisfaction) are observed to be significant predictors of all dimensions of ERB with a marginal contribution of socio-demographic variables. Implications of the findings for school effectiveness are adequately discussed.


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Abstract: A community-based survey was made to assess the school participation and dropout rates, households’ attitude towards education, households’ ability and willingness to educate their children. Data were collected using a household survey questionnaire on a total of 1034 (rural = 747 and urban = 287) households in six PAs and two UDAs randomly selected from Yergachife and Bule Woredas, Gedeo Zone, Southern Ethiopia. Descriptive statistics, Chi-square analysis and t-statistic were computed to find possible differences with respect to gender, literacy status, and households’ attitudes towards education, location and
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residential variations. The results revealed that literacy status, gender of the household head, location and residential variations are significantly (p < .01) associated with households’ ability to pay for schooling. Residential variation and family size are found to markedly affect households’ willingness to educate their children. However, statistically significant differences are observed in age at entry into grade one due to differences of location, place of residence and gender of the household head. Implications of the findings to address the existing problems are also discussed in this paper.


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Abstract: The purpose of this article is to provide a more comprehensive picture of teacher preparation in Ethiopia on top of a closer scrutiny of current teacher education reforms. In particular, it presents teacher education within the context of policy implementation over the last six decades by highlighting key reforms and how these reforms impacted the education system in general and the teaching profession in particular. In analysing why and how the policy reforms took place, the paper draws on Chin and Benne’s strategies of change management and the world system theories. Further, based on government statistics, official policy documents, and observations, the paper argues that the series of policy interventions were short of addressing the challenges of teacher preparation, including maintaining minimum quality standards, though the sector’s expansion has had favourable impact on educational access and bridging regional and gender disparities.

Key words: Teacher education, teacher preparation, teacher education policy, Ethiopia


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Abstract: After nearly two decades of military dictatorship, democratic civic education has been integrated into the Ethiopian school curriculum. This paper examines the policy–practice concordance in implementing the civic education curriculum based on empirical evidence generated on the philosophical underpinnings, curricular contents, pedagogical approaches, and the role of instructional technology. Data were gathered through a questionnaire survey on 179 randomly selected high school students, key informant teachers, and content analysis of students’ textbooks, teachers’ guides, and official policy documents. The findings reveal that the existing civic and ethical education curriculum is eclectic in its character blending the minimal interpretation of democratic civic education with the inclusive conception of ethno-cultural diversity relevant to multicultural societies. Nevertheless, the manner in which the TV-instruction is used in classrooms is found to hinder interactive learning that is instrumental to nurture democratic and active citizens.

Key words: Civic education, TV Instruction, Curriculum, Learner-centered teaching, Ethiopia


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Abstract: This study examines the level of intergroup relations among Ethiopian university students coming from ethnically and religiously diverse backgrounds. The article conceptualized intergroup contact in terms of students’ cross-group friendship. It investigates the extent to which intergroup contact is affected by attitude towards other ethnic (IEA) and religious (IRA) groups, their perceived cross-ethnic cohesiveness
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(CEC), ethnic-orientation, and patriotism. Data were gathered based on a survey of 188 students drawn from one of Ethiopia’s public higher education institutions. The findings reveal that the majority of the students showed favorable attitude towards other ethno-cultural and religious groups, and attitude towards other ethnic groups (IEA) is found to be independent of one’s ethnic background. Nevertheless, while cross-ethnic friendship is negatively affected by language difficulties, failure to make friends from religious out-group is associated with strong conformity with the teachings of the respective religions. Finally, the article forwards policy recommendations for increased intercultural understanding and improved intergroup relations.

Key words: Intergroup contact, ethnic identity, cross-ethnic cohesiveness, cross-group friendship, language


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Abstract: The purpose of this study is to determine the factorial validity of an adapted “Attitudes towards Mathematics Inventory (ATMI)” measure. The ATMI was originally developed by Tapia and Marsh (2004) in the western culture to measure attitudes towards Mathematics. This paper reports the psychometric properties of the adapted Amharic version of the ATMI based on a sample of 385 Ethiopian university students enrolled for Mathematics classes. Confirmatory Factor Analysis (CFA) procedure is employed to test the factorial validity of the ATMI-Amharic. The results reveal that the original four-factor model (Self-confidence, Enjoyment, Motivation, and Value) is retained for the adapted ATMI-Amharic since no statistically significant difference ($\chi^2 = 1.827, p = 0.401; \text{RMSEA} < 0.0001$) was found between the base and the observed models. Further, a test of factorial invariance across gender groups and year-levels also yielded that the model has measurement invariance revealing the ATMI-Amharic is independent of gender and number of years in college. Besides, the coefficient alphas for the four subscales ($\alpha = 0.78-0.89$) and for the overall measure ($\alpha = 0.94$) are found to be high. The implications of the findings in relation to the psychometric properties of the ATMI-Amharic and its use in Ethiopian context are discussed.

Key words: Mathematics Education, Mathematics Attitude, Construct Validation, University, Ethiopia


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Abstract: The rapid quantitative growth of higher education in Ethiopia has triggered considerable concern for quality. The present paper analyses why expanding the higher education subsector took precedence over quality against the backdrop of the current Ethiopian political discourse. This article argues that the growing public demand due to globalization and the changed local realities, the ideology of social inclusion and distributive justice, and poverty reduction rationales are the main forces driving the unprecedented growth. Further, the study examines the current state of quality assurance at system and institutional levels and their potency to maintain the equilibrium between quantitative growth and quality enhancement based on data obtained through interviews, analysis of relevant policy documents, and government statistics. Finally, ways of redressing existing quality gaps in the higher education subsector are discussed.

Key words: expansion; quality; quality assurance; higher education; Ethiopia


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Abstract: Over the last two decades, Ethiopia has substantially expanded its education system at all levels. This necessitates a commensurate expansion and strengthening of educational research not only to inform policy decisions, but also to bolster the creation and dissemination of knowledge that can positively influence educational practice. Zooming specifically into the events in the last decade, this article attempts to reflect on EJE’s contributions to educational research and the challenges it encountered along the road based on 90 research papers published in it between 2000 and 2009. To that effect, multiple data generating procedures were used including content analysis of textual materials, web search using Google Scholar, and analyses of secondary sources. The findings confirm that EJE is still the leading educational journal in the country instrumental in addressing the national educational priorities notwithstanding its relatively low visibility and span of circulation both at home and abroad. The paper finally recommends the ways in which EJE can emerge as a viable scholarly outlet and become more focused, accessible, and consequential to supporting the desire to ensure equal educational access of acceptable quality.

Key words: Educational research; journal quality; journal visibility; Ethiopia.

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Abstract: This study investigated the extent, causes, and correlates of vulnerability to brain-drain among Ethiopian academics in higher education institutions (HEIs). The sample constituted a total of 103 faculty members (Females 9.3% and Males 90.7%) drawn from three colleges and four faculties affiliated to the Debub University. Data were collected through self-reported measures assessing vulnerability to brain-drain (external brain-drain conceptualized as intention to remain in a western country given that they would have opportunities for further study or research; and internal brain drain defined as a brain circulation within the country), affective job characteristics (job satisfaction and organizational commitment), and work environment factors. The results show that affective job characteristics and work environment variables significantly predicted vulnerability to internal brain-drain. While external brain drain is associated with vulnerability to internal brain drain and organizational citizenship behavior (OCB). A closer investigation into the prominence of the pull and push factors further disclosed that working condition and the salary are the outstanding ones. Implications of the findings for policy making are also discussed.

Key words: Brain drain, Internal brain drain, Working conditions, University, Ethiopia


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Abstract: This paper investigates the enrolment trends and the critical factors that impinge on students’ choice of physics as major field of study. The data were generated from primary and secondary sources. Primary data was acquired based on a semi-structured interview with 14 sophomore and 11 senior students and five instructors of the department of physics at Hawassa University, Ethiopia. In addition, data on allocation of students to various major fields as well as quantitative data on academic achievement were obtained from the university’s registrar office. The results indicate that the rate of enrolment in physics is the lowest and applicants who were assigned to the physics undergraduate programs were those whose mean score in Ethiopian National Higher Education Entrance Examination was the lowest compared to any other group. Further, the findings show unprecedented gender gap in enrollment and graduation rates. The explanations given for the low enrollment rate were inadequate pre-university preparation, weak mathematics background, lack of job opportunity outside the teaching profession, and poor teacher qualification and pedagogical content knowledge. Finally, this article forwards policy recommendations to bolster the alarmingly declining state of physics education in Ethiopia.

Key words: Enrollment, gender balance, physics, Ethiopia


Abstract: This article reports a descriptive account of naming practices in Gurage society. It specifically aims to investigate the socio-cultural roles of names; if the names have formal and semantic patterns; and the extent to which the cultural naming practices are maintained through time. Qualitative research method was followed in the study. Socio-cultural and linguistic data were collected using key informants. The collected data were analyzed thematically; they were grouped based on gender differences, formal patterns, and meaning. Trend analysis was used to show degree of maintenance and endangerment of cultural name giving practices. The results of the study showed that names, which are often given by grandparents, parents or neighbors express the name givers aspirations, fears, beliefs, gender roles and power relations. The naming patterns largely changed from cultural or ethnic personal names into Amharic and religious names. The causes for such changes were found to be denigration, religion, and Amharic hegemony. It was further found that giving cultural personal names to newborn babies were revitalized in the last two decades.

Key words: endangerment, Gurage, name, patterns, roles

Abstract: This article examines the inherent intelligibility among Guragina varieties, which are systematically selected to represent the major linguistic variation within this cluster of closely related dialects or languages. Three types of comparisons, lexical, phonological and morphological are used. The lexical comparison was based on 255 lexical items of frequent use and the Swadish wordlist, which is said to be change resistant. The phonological variation was established through 38 sound correspondences found in 122 words selected from the lexical comparison. The morphological comparison was based on 44 inflectional and derivational affixes. The morphemes were first described in sets and then the numbers of shared and non-shared morphemes were statistically computed. The lexical comparison provided the following result (from the Guragina variety with the highest to the lowest amount of shared vocabulary): Mesqan, Muhir, Cheha, Kistane, Welene and Inor. According to the phonological comparison, the following grouping was established: Mesqan, Kistane, Cheha, Welene, (Cheha, Kistane) and Inor. If the three groupings are combined, the following hierarchy occurs from the variety with most shared items to the variety with the least shard ones: Mesqan, Muhir, Cheha, Kistane, Welene, and Inor.

Key terms: Guragina, intelligibility, lexicon, morphology, phonology, varieties

Abstract: The purpose of this article was to investigate how Gurage people address development issues and inculcate them into the community through proverbs. The data was collected through elicitation and texts. The analysis method used was qualitative description, hence interpretive aspects of Wemaka ‘proverb’. The proverbs were thematically grouped and the culturally and pragmatically constituted meanings were interpreted. The finding showed that Gurage people use proverbs to discourage laziness as in nimasur ba-sur ji-bera (lazy with-broken 3SGM-eat) ‘a lazy person eats with a broken utensil,’ and to encourage
hard work as in b-adʒ ja-fənə ba-fəfənə (with-hand 3SGM-come with-happiness) ‘a resource that comes through hard work makes someone happy’. The proverbs also indicated why the Gurage people are business oriented and mobile. The themes revolved around resource and time management, mobility, planning, independence, power relations, and the problems of corruption. Finally, the study recommended a further research on folklores of Gurage in particular and that of Africa in general.

**Key words:** Culture / Development / Discourse / Gurage / Proverb


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**Abstract:** Recounting the views of the government, opposition politicians, academics and the private press itself as represented by their editors, the study argues that the private print media in Ethiopia are subject to external and internal challenges that dwarf its role in helping the transition to democracy. The volatility of the socio-political context regarding their operation and the low readership culture could be singled out among the external challenges to the private media. The major challenge associated with the private print media themselves is lack of professional knowledge and capacity. The study uses McQuail’s Normative Theory of Media Structure and Performance to frame the role of the private print media in Ethiopia of the last two decades. Though the private print media contributed to the struggle for democracy, their role is below the societal demands.

**Key words:** The private print media, McQuail’s normative theory of media structure and performance, post-socialist Ethiopia, democracy


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**Abstract:** Though women are among the most productive sectors of the society, especially in rural areas, they are deprived of access to valuable extension information. The present study investigates farm housewives access to agricultural agents in the process of transfer of innovation information in some zones of 12-South Nations Nationalities and Peoples’ Regional State (SNNPRS), in Ethiopia. A structured questionnaire was used to collect data from 284 randomly selected agents in the area. Descriptive statistics and chi-square were used for statistical analysis. The demographic characteristics of the agents show that male agents 214 (75.4%) in the age group of 25-35 years and married 61.6%) were dominant in the sample population. It was also found that majority of them were staying at a distance of 6-10kms from a nearby city, and had diploma level education, while having agricultural experience between 4-7 years. There was significant relation between gender and agents access to farm housewives; however, no significant relation was detected in case of other demographic and socioeconomic variables such as age, marital status, parent background, distance from city, and experience. It was recommended that more female agents should be recruited; priority should be given to candidates from rural background and training should be given to agents on how to provide valuable information to farm housewives.

**Key words:** Access, gender, Agents, Innovation, SNNPRS

*Yohannes Shiferaw¹ and D.V.R. Murthy², 2012. Agricultural agents’ training needs and perception about trainings given in Ethiopia: A case of some Zones in SNNPRS, Inter. Monthly Refereed Jour. of Res. in Man. & Tech., 2: 45-53

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Abstract: Extension agents shoulder difficult tasks in the field, under severe weather and minimum logistic conditions. Agricultural knowledge provided to them through trainings helps these agents tremendously. The present study investigates agricultural agents’ training needs and their perceptions about trainings given currently in some zones of SNNPRS, Ethiopia. Questionnaire was used to collect data from 284 randomly selected agents in the area. Descriptive statistics and chi-square were used for statistical analysis. The response show that there were 75.4% male agents, that majority of agents were in the age group of 25-35 years and that married agents were dominant in the sample population. It was also found that majority of them had diploma level education, and that they had agricultural experience between 4-7 years. Agents indicated that they needed more training in animal breeding, crop production and environment as ranked respectively. Significant relation was found between gender and perception of relevance of training; however, no significant relation was detected in case of other demographic and socioeconomic variables such as age, marital status, education and experience. It was recommended that trainings be given to agents on animal breeding and crop production and that all trainings need to be responsive to agents’ knowledge requirement

Key words: Training Needs, Agents’ Perception, Knowledge, SNNPRS


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Abstract: This research was mainly an experimental study intended to examine the effects of training in the learning strategies of writing in improving students’ writing skills with regard to discussing relevant contents, organizing contents appropriately and using accurate grammar, appropriate vocabulary and correct mechanics. To this end, the selected freshman program students of Hawassa University were randomly assigned to the experimental and the control groups. Students in the experimental group were taught lessons of the Basic Writing Skills course with training in the learning strategies of writing, whereas those in the control group were taught the lessons without training in the learning strategies of writing. Data were collected mainly through writing skills tests. Independent-Samples T Test which was computed for the pre-test revealed that the students who were assigned to the experimental and the control groups had similar writing skills with regard to discussing relevant contents, organizing contents appropriately and using accurate grammar, appropriate vocabulary and correct mechanics (t-values < 1.56, p-values > .122). The Independent-Samples T Test computed for the post-test, however, demonstrated that the students in the experimental group significantly outperformed the students in the control group on each of the aspects of writing (t-values > 2.50, p-values < .014). As revealed through the interview held with selected students of the experimental group, students in this group could significantly surpass students in the control group because the training benefited the students in the experimental group to learn the role of the strategies to improve their writing skills and it improved their belief about taking on more responsibility for their own learning of writing, and thus they continued to use the strategies appropriately when they carried out writing tasks in and outside class. Based on the findings, a recommendation has been made that writing tasks should be introduced in the context of training in the learning strategies of writing. As a result, students could improve their writing skills by using the strategies appropriately and by taking on more responsibility for their own learning of writing. Moreover, it has been recommended that studies could be conducted on other issues as to training in the learning strategies of writing.

Key words: Learning strategies, Writing skills, Incentration, Writing techniques


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**Abstract:** This study was intended to examine the correlation between students’ use of direct (memory, cognitive and compensation) and indirect (metacognitive, affective and social) as well as overall learning strategies of writing and their writing performance. To this end, the selected freshman program students of Hawassa University were made to fill in learning strategies of writing questionnaire, which included items on direct and indirect learning strategies of writing, and to take a writing test. The correlations were examined through Pearson product-moment correlation coefficient (r). To determine the strength of a correlation, the cut-off points suggested by Cohen were applied. Moreover, the coefficient of determination was computed to see the extent to which the students’ use of the learning strategies of writing predicts their writing performance. Thus, this research employed a quantitative-methods design. The Pearson r demonstrated that there was a strong positive correlation between the students’ use of direct and indirect as well as overall learning strategies of writing and their writing performance. The coefficient of determination also revealed that the students’ use of the learning strategies of writing predicts their writing performance at above 63%. Based on the findings, recommendations have been made.

**Key words:** Correlation, direct and indirect learning strategies of writing, writing performance


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**Abstract:** This research was intended to examine if training in the learning strategies of writing brings significantly different effects on students of different ability groups of writing (high, medium and low), user-groups of the strategies (high-users, medium-users and low-users) and gender with regard to improving their belief about autonomous learning of writing. To this end, the selected freshman program students of Hawassa University were taught lessons of the Basic Writing Skills course with training in the learning strategies of writing. Data were collected through a five-point Likert Scale questionnaire. The research employed a quantitative-methods design. One-Way ANOVA computed revealed that there was a significant difference among the high, medium or low ability groups and among the high, medium or low user-groups of the learning strategies of writing with regard to improving their belief about autonomous learning of writing after receiving the training (F-value = 5.58 and P-value = .006 for the ability groups; F-value = 7.068 and P-value = 0.002 for the user-groups). The Post Hoc Tests computed demonstrated that the high ability group outperformed the low ability group (P-value = .006), and the high user-group surpassed the medium and low user-groups (P-values = .030, .003). Independent-Samples T Test computed indicated that there was no significant difference between males and females with regard to improving their belief about autonomous learning of writing after receiving the training (T-value = 1.694, P-value = .103).

Based on the findings, a recommendation has been made that training in the learning strategies of writing should be conducted by giving due attention to the low achievers and to the medium and low-users of the strategies, at least by minimizing factors that might make them not to benefit from the training, to improve their belief about autonomous learning of writing. Moreover, studies should be conducted to explore factors that make these students not to benefit from the training to improve their belief about autonomous learning of writing.

**Key words:** Training in the learning strategies of writing, groups, gender, belief, autonomous learning

**INSTITUTE OF TECCHNINOLOGY**

**SCHOOL OF MECHANICAL AND INDUSTRIAL ENGINEERING**

**Abstract:** The importance of the supply chain modeling and improving has long been recognized as one of competitiveness strategy in scientific research. However, most of the performed work has focused on designing supply chain modeling and improving in developed countries with fewer concerns for their partners in developing countries. The manufacturing industry in developing countries has experienced fierce competition for their product and consequently, a loss of market share. The Supply-Chain Operations Reference (SCOR) provides a standard description of supply chain processes, performance metrics, best practice and enabling technologies. It offers a comprehensive methodology to improve supply chain operations. It is designed by the Supply-Chain Council (SCC). It is widely acknowledged as the quasi–industry standard for supply chain management. This paper presents a literature review of published material so far relating to SCOR model adaptation. The results of SCOR model adaptation for six different application works are reviewed & discussed for future research.

**Key words:** SCOR model, Developing countries, Manufacturing industry, Model adaptation


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**Abstract:** The global integration and rapid applicability of supply chain concepts in manufacturing industries creates both opportunities and challenges for developing countries. The developing countries are becoming more open to adapting and accepting Western business practices. One of the important issues in this context is the use of the standard performance measurement systems. In the current literature, the capability to measure the performance of manufacturing industry operations can be seen as an important prerequisite for improvement. Companies have increased the capabilities of their performance measurement systems. The manufacturing industries in developed countries have been developed and implemented successfully multi-dimensional performance measures, and measurement systems for their business success. Whereas research results and data related to developing country's state of performance measures are very minimal. With the recent global integration and economic relevance of developing countries, we investigated the level of performance measurement systems in Ethiopian. The paper presents the existing practices in performance measures, and measurement systems based on case studies on twelve companies and questionnaire survey on thirty two companies'. A survey and case study results show that manufacturing industries still largely use financial and productivity performance measures. Despite the powerful advantages of performance measurement, it has not been widely implemented in the manufacturing industry in developing countries. The current performance measurement systems have faced different challenges what they did not encounter in developed nations companies. Especially, the existing infrastructures as enablers were much below the required standard. Further research and analysis could be done to adapt the performance measurement systems to the developing countries scenarios.

**Key words:** performance measurement system; key performance indicators; developing country, industrial analysis.


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Academic Success Depends on Research and Publications

Abstract: Firms in developing countries are adopting best practices to improve their organizational performance. They have been focusing on achieving productivity gains in their operations by implementing best practices. However, these efforts could not lead to expected benefits. The main reasons for failure in adopting the best practice which it face new environmental scenarios different for which it was created. This paper explores the best practices implementation and challenges encountered during the process of adoption. The research methodology includes a literature review, questionnaire survey and semi-structured interview. The Ethiopian manufacturing firms were sampled for empirical study. The research survey was based on SCOR model best practices. The findings show that most of the respondent firms have shown interests and put efforts to implement some of them. But, the results were below the expectations. The implementation of the best practice has faced different challenges and unavailability of the required enablers. Therefore, there is a need for developing countries to analyze their scenarios and then adapt the best practices that consider their real situations.

Key words: best practice, developing country, manufacturing industry, SCOR model


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Abstract: The research deals with the analysis and the current quality management practices in Ethiopian manufacturing industries. The research is based on a survey conducted on 55 representative industries all over the country. A brief introduction is given on the fundamental concepts of quality with reference to the recent literature in the area so as to help readers follow the model developed. The quality problems of the industries and the root causes that trigger them have been analyzed by employing a well structured questionnaire. Then a quality management implementation model is developed along with the step-by-step approach to attain the goal. Finally a number of recommendations are given at individual level, institutional level and at a national level. This paper may also be considered as a summary of the existing situation and a lead for future researches in the field.


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Abstract: This paper presents a research agenda on the SCOR model adaptation. SCOR model is designated to measure supply chain performance and logistics impact across the boundaries of individual organizations. It is at its growing stage of its life cycle and is enjoying the leverage of becoming the industry standard. The SCOR model has been developed and used widely in developed countries context. This research focuses on the SCOR model adaptation for the manufacturing industry in developing countries. With a necessary understanding of the characteristics, difficulties and problems of the manufacturing industry in developing countries’ supply chain; consequently, we will try to designs an adapted model with its building blocks: business process model, performance measures and best practices.

Key words: developing countries, manufacturing industry, SCOR model adaptation

Academic Success Depends on Research and Publications

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Abstract: Modelling and control of space robots is not an easy task to perform, because the equations of motion that govern phenomenon are highly nonlinear. Furthermore, unlike fixed base manipulators a freefloating space robot exhibits non-holonomic behavior as a result of the non-integrability of the angular momentum conservation law. In recent days space robots are extensively used to play a significant role in space applications like, scheduled servicing of satellites and spacecrafts including refuelling tasks, inspection of remote sites or verification of structures, retrieval of tumbling tools or astronauts, and assembly or welding of space structures. In a large number of these applications, the manipulator endeffector is required to interact with the environment. Due to the interaction between the endeffector and the environment, the interaction torques act on the endeffector which gets transmitted through links to the base of the vehicle and the orientation of the vehicle changes. Hence, precise control of the manipulator’s trajectory, attitude and impedance are critically important. This paper addressed the current state-of-the-art in key areas of the space robotics by reviewing recently available literatures particularly on free flying and free floating space robots which help in summarizing various research outcomes in a structured manner.

Key words: space robots, free floating space robots, attitude control, impedance control, trajectory control


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Abstract: The performance of a machine tool is eventually assessed by its ability to produce a component of the required geometry in minimum time and at small operating cost. It is customary to base the structural design of any machine tool primarily upon the requirements of static rigidity and minimum natural frequency of vibration. The operating properties of machines like cutting speed, feed and depth of cut as well as the size of the work piece also have to be kept in mind by a machine tool structural designer. This paper presents a novel approach to the design of machine tool column for static and dynamic rigidity requirement. Model evaluation is done effectively through use of General Finite Element Analysis software ANSYS. Studies on machine tool column are used to illustrate finite element based concept evaluation technique. This paper also presents results obtained from the computations of thin walled box type columns that are subjected to torsional and bending loads in case of static analysis and also results from modal analysis. The columns analyzed are square and rectangle based tapered open column, column with cover plate, horizontal partitions and with apertures. For the analysis purpose a total of 70 columns were analyzed for bending, torsional and modal analysis. In this study it is observed that the orientation and aspect ratio of apertures have no significant effect on the static and dynamic rigidity of the machine tool structure.

Key words: Finite Element Modeling, Machine tool structure, Static Analysis, Modal Analysis


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Abstract: Heat exchanger is one of the commonly used devices for obtaining required temperature. Apart from the behavior of mechanical structure, the performance with reference to sensitivity of the heat exchanger also depends mainly on its sub components namely, data acquired from the sensors, the type of controlling action to be activated and at the end, the behavior of the actuator and control valve. It is found that an error occurred in any one of the components will reduce the performance of the heat exchanger. Here we have made an attempt to design the instrumentation system with reference to the component sensitivity. A cascade controller has been designed theoretically using Zigler–Nichols (Z-N) method and has been implemented for the real time system, the obtained results show that the designed concepts considered for implementing instrumentation system are appropriate and can be used for real time applications.
Key words: Instrumentation system, shell and tube heat exchanger (SE), cascade controller and sensor.

DEPARTMENT OF BIOSYSTEMS AND ENVIRONMENTAL ENGINEERING

Gerawork. Zeleke¹, Owende P.M.O², Kanali C.L¹, and Ward S.M¹, 2007. Predicting the pressure–sinkage characteristics of two forest sites in Ireland using in situ soil mechanical properties. Biosystems Engineering, 97(2): 267-281

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Abstract: The mechanical properties of two forest soils in Ireland were determined in order to model the pressure−sinkage characteristics of the forest floor. The stiffness values of the surface mat and the underlying weak peat substrata, and Young's modulus were determined from in situ load−sinkage experimental data obtained from the sites. The measured mean values of stiffness of surface mat (underlying peat soil) were found to vary between 368 and 1634 (1028 and 4320 kN/m³). The measured mean value of Young's modulus of the forest floor was found to vary between 427 and 718 kN/m². A non−linear model that predicted the pressure−sinkage characteristics of the forest floor, with less than 19% error, was developed. Application of the non-linear model for prediction of potential site damage by timber harvesting and extraction machinery traffic was exemplified. Such application of the model has an advantage in that it only requires Young's modulus of the soil and harvesting machine configuration to be known.

Tieman D¹, Gerawork. Zeleke²,*Owende P.M.O³, C.L. Kanali², Lyons J¹, and Ward S.M¹, 2004. Effect of Working Conditions on Forwarder Productivity in Cut-to-length Timber Harvesting on Sensitive Forest Sites in Ireland, Biosystems Engineering, 87(2): 167-177

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Abstract: Time and motion studies were conducted to evaluate the impact of terrain characteristics and work methods on forwarder productivity in cut-to-length timber harvesting system. Time elements of the forwarder operation that were recorded included: loading time, unloading time, and travel times for the loaded and empty forwarders. Productivity was evaluated as the volume of the timber payload during the corresponding productive system time (PST) in m³ h[PST]⁻¹ without delays. It was found that the forwarder productivity reduced exponentially with increasing distance of timber extraction, and independently of the payload. The productivity for forwarding operation on clearfelled sites classified as easy and difficult terrain conditions, ranged from 24·13 to 27·65, and 15·90 to 27·46 m³ h[PST]⁻¹, respectively. The corresponding rates of decline in productivity ranged from 0·0494 to 0·0082 m³ h[PST]⁻¹ and 0·163 to 0·0116 m³ h[PST]⁻¹ per metre of extraction distance at 50 and 300 m, respectively. These observations suggest that maximisation of payload and optimisation of timber extraction distance are more crucial for economic forwarding on difficult sites. Uphill extraction reduced the forwarder productivity by between 0·8 and 5·1 m³ h[PST]⁻¹ compared to downhill, hence, the latter should be adopted wherever it is practicable, for economic reasons.

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Abstract: Tumor-derived vascular endothelial growth factor (VEGF) has previously been identified as a causative factor in the disturbed differentiation of myeloid dendritic cells (DC) in advanced cancer patients. Here, we investigated the potential of vascular endothelial growth factor receptor (VEGFR) tyrosine kinase (TK) inhibition to overcome this defective DC differentiation. To this end, peripheral blood DC (PBDC) precursor and subset frequencies were measured in 13 patients with advanced cancer before and after treatment with AZD2171, a TK inhibitor (TKI) of VEGFR, coadministered with gefitinib, and an epidermal growth factor receptor (EGFR) TKI. Of note, not only myeloid DC but also plasmacytoid DC frequencies were significantly reduced in the blood of the cancer patients prior to treatment, as compared to healthy controls. Moreover, besides an accumulated population of immature myeloid cells (ImC), a population of myeloid suppressor cells (MSC) was significantly increased. Upon systemic VEGFR TK inhibition, DC frequencies did not increase, whereas the rate of circulating MSC showed a slight, but not significant, decrease. In conclusion, TK inhibition of VEGFR with AZD2171 does not restore the defective PBDC differentiation observed in advanced cancer patients.


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Abstract: Soil degradation is evident in the mountainous areas of Ethiopia, is often represented as results of human pressure. It can be improved through different Soil and Water Conservation (SWC) measures. The study was conducted in Goromti watershed, in western Ethiopia to evaluate the impact of Fanya juu structures on some soil physical & chemical properties. Cultivated fields treated by five years and ten years old fanyajuu structures were compared with non conserved cultivated land (control) and evaluated under three slope gradients. The slope gradients were; gentle (3-15%), moderately steep (15-30%) and steep slope (>30%). A total of 27 soil samples were collected from the top 20 cm soil depth replicated three times and selected physical and chemical properties were analysed in the laboratory. The results of the study showed that soil pH, soil organic carbon (SOC), total nitrogen (N) were significantly (p≤0.05) different on farms treated by the fanyajuu compared to the non-conserved plots as well as under the different slope gradients. Bulk density (Db), sand and clay fractions were significantly varied with slope gradient. Soil organic carbon and total N were higher while bulk density was lower in soil under the non-conserved fields than in fields with fanyajuu structures. But no significant difference was observed in soil bulk density, sand and clay fractions among treatments. Similarly, CEC, available K and available P, and exchangeable K+, Ca2+, and Mg2+ didn’t show any significant differences with respect to structures and slope gradient. The research indicates that structures could benefit farmers through improving the nutrient status better if integrated with agro-nomic measures by using vegetation suitable for the local environment in one hand, and properly maintained for longer period of time, on the other.

Key words: Fanya Juu, Cultivated Lands, Soil Fertility, Soil Properties, Western Ethiopia

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